1337.

SUPREME COURT OF THE UNITED STATES.

No. 103.

ERASTUS CORNING & JOHN F. WINSLOW, PLAINTIFFS IN ERROR,

vs.

PETER A. BURDEN.

IN ERROR TO THE CIRCUIT COURT, U. S., FOR THE NORTHERN DISTRICT OF NEW YORK.

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[Gideon, Printer.]

The President of the United States of America, to the judges of the circuit court of the United States, for the northern district of New York, in the second circuit, greeting:

Because, in the record and proceedings, and also in the rendition of a judgment in a plea which is in the said circuit court before you, between Peter A. Burden, plaintiff, and Erastus Corning and John F. Winslow, defendants, manifest error hath happened to the great damage of the said Erastus Corning and John F. Winslow, as by their complaint appears; and it being fit that the error, if any there hath been, should be corrected, and full and speedy justice done to the parties aforesaid in this behalf, you are hereby commanded, if judgment be therein given, that then, under your seal distinctly and openly, you send the record and proceedings aforesaid, with all things concerning the same, to the Supreme Court of the United States, together with this writ, so that you have the same at Washington on the first Monday of December next, in the said Supreme Court to be then and there held, that the record and proceedings aforesaid being inspected, the said Supreme Court may cause further to be done therein, to correct that error, what of right and according to the law and custom of the United States should be done.

[SEAL.]

Witness the honorable Roger B. Taney, chief justice of the Supreme Court of the United States, the twentieth day of May, in the year of our Lord one thousand eight hundred and fifty-two.

A. A. BOYCE, *Clerk.*

DAVID L. SEYMOUR, *Attorney.*

Allowed on the condition specified in the order heretofore entered.

A. CONKLING.

UNITED STATES OF AMERICA, *ss.*

By the honorable Alfred Conkling, one of the judges of the circuit court of the United States, for the northern district of New York, in the second circuit, to Peter A. Burden, greeting:

You are hereby cited and admonished to be and appear at a Supreme Court of the United States, to be holden at Washington on the first Monday of December next, pursuant to a writ of error filed in the clerk's office of the circuit court of the United States, for the northern district of New York, in the second circuit, wherein Erastus Corning and John F. Winslow are plaintiffs in error, and you, the said Peter A. Burden, are defendant in error, to show cause, if any there be, why the judgment in the said writ of error mentioned should not be corrected, and speedy justice should not be done to the parties in that behalf.

Given under my hand at Rochester, the twenty-second day of May, 1852.

A. CONKLING.

Supreme Court of the United States.

ERASTUS CORNING and John F. Winslow,
plaintiffs in error,
vs.
PETER A. BURDEN, defendant in error.

UNITED STATES OF AMERICA,
Northern district of N. Y., county of Rensselaer, ss.

Horatio F. Averill, of the city of Troy, clerk in the law office of David L. Seymour, the attorney for the above named plaintiffs in error, being duly sworn says, that on the 24th day of May, 1852, at the said city of Troy, he, this deponent, duly served a copy of the annexed citation on the above named Peter A. Burden, to whom the same was directed and addressed personally; and he further says, that said copy was by deponent, on the occasion aforesaid, delivered to and left with the said Peter A. Burden, who was known to deponent to be the person to whom the same was directed and addressed, and who was named as defendant in error therein.

And further says not

HORATIO F. AVERILL.

Sworn before me June 10, 1852.

HENRY A. CLUM,
Clerk of Rens. Co., and of the supreme court of the State of N. Y.

CIRCUIT COURT OF THE UNITED STATES,
For the northern district of New York.

ERASTUS CORNING and John F. Winslow,
ads.
PETER A. BURDEN.

UNITED STATES OF AMERICA,
Northern district of New York, county of Rensselaer, ss.

Horatio F. Averill, clerk in the law office of David L. Seymour, the attorney for the above named Erastus Corning and John F. Winslow, being duly sworn says, that on the 24th day of May, 1852, at the city of Troy, he, this deponent, duly served a copy of the annexed citation on the above named Peter A. Burden, to whom the same was directed and addressed, personally; and he further says, that said copy was by deponent on the occasion aforesaid, delivered to and left with the said Peter A. Burden, who was known to deponent to be the person to whom the same was directed and addressed, and who was named as defendant in error therein.

And further says not

HORATIO F. AVERILL.

Sworn before me June 10th, 1852.

HENRY A. CLUM,
Clerk of Rens. co., and clerk of the supreme court of the State of N. Y.

Circuit court of the United States, in and for the northern district of New York.

ERASTUS CORNING and JOHN F. WINSLOW, plaintiffs in error,
vs.
PETER A. BURDEN, defendant in error.

UNITED STATES OF AMERICA,
Northern district of New York, ss.

I, Augustus A. Boyce, clerk of the circuit court of the United States of America, for the northern district of New York, in the second circuit, do hereby certify, to the Supreme Court of the United States, that the bill of exceptions, record of judgment, and rule hereunto annexed, are true transcripts of their respective originals remaining on the files of my office in the above entitled cause.

In testimony whereof I have hereunto subscribed my name and affixed the seal of the said circuit court, this fifth day of [SEAL.] July, in the year of our Lord one thousand eight hundred and fifty-two, and of the independence of the United States of America the seventy-seventh.

AUGUSTUS A. BOYCE, *Clerk.*

Bill of exceptions.

Circuit court of the United States, for the northern district of New York.

ERASTUS CORNING and JOHN F. WINSLOW ads. PETER A. BURDEN.

UNITED STATES OF AMERICA,
Northern district of New York, ss.

Be it remembered that, on the eighth day of February, one thousand eight hundred and forty-nine, as yet of the term of October, one thousand eight hundred and forty-eight, came Peter A. Burden, by Samuel Stevens, his attorney, into the circuit court of the United States, for the northern district of New York, before the judges thereof, and impleaded Erastus Corning and John F. Winslow in a certain plea of trespass on the case, in which the said plaintiff declared against the said defendants, in these words:

Circuit court of the United States, for the northern district of New York. On the eighth day of February, 1849, as yet of the term of October, one thousand eight hundred and forty-eight.

NORTHERN DISTRICT OF NEW YORK, *ss.*

Peter A. Burden, a citizen of the United States, plaintiff in this suit, by Samuel Stevens, his attorney, commences this his action against

Erastus Corning and John F. Winslow, defendants in said suit, by filing this, his declaration, in the office of the clerk of this court, according to the rules of the court, and complains of the said defendants of a plea of trespass on the case.

For that whereas Henry Burden, a citizen of the United States, before and at the time of the granting of the letters patent, as hereinafter set forth, was the original and first inventor and discoverer of a new and useful machine for rolling puddle balls, or other masses of iron in the manufacture of iron, to wit, at the city of Troy, and within the district aforesaid; and thereupon, heretofore, to wit, on the 10th day of December, in the year 1840, at the city of Washington, upon the application of the said Henry Burden, in due form of law to the Commissioner of Patents, letters patent were duly issued, in the name of the United States of America, in due form of law, under the seal of the Patent office of the said United States, signed by John Forsyth, secretary of State, and countersigned by Henry L. Ellsworth, commissioner of patents, bearing date the day and year last aforesaid, and were duly delivered to the said Henry Burden, which said letters patent and the specifications thereto annexed, and forming a part thereof, the plaintiff brings here into court, wherein and whereby was granted to the said Henry Burden, his heirs, administrators, or assigns, for the term of fourteen years from and after the date of the said patent, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said machine, as by the said letters patent in court to be produced will fully appear.

And the said Henry Burden, afterwards, to wit, on the 10th day of November, 1848, at the city of Troy, and within the northern district of New York aforesaid, by a certain deed of assignment, then and there made by the said Henry Burden, to the said plaintiff, which said deed, sealed with the seal of the said Henry Burden, the said plaintiff now brings here into court, for the consideration therein mentioned, did assign, transfer, sell, and set over, unto the said plaintiff, all the right, title, interest, and benefit granted and secured to him, the said Henry Burden, by said letters patent. Which said deed afterwards, to wit, in the month of January, 1849, was duly recorded in the Patent office at the city of Washington, as by reference to the said deed of assignment, and the certificate of the recording thereof, therein endorsed, will fully appear. And the said plaintiff further says, that the said exclusive right so as aforesaid secured to the said Henry Burden by the said letters patent, and assigned by the said Henry Burden to the said plaintiff as aforesaid, has been possessed and used by him, the said plaintiff, since the said assignment, and is of great value to him, the said plaintiff, to wit, of the value of fifty thousand dollars.

Yet the said defendants, well knowing the premises, but contriving and wrongfully intending to injure the said plaintiff, and to deprive him of the profits, benefits, and advantages, which he might, and otherwise would, have acquired and derived from the said exclusive right of making, using, and vending to others the right of using, the

said machine described in said letters patent, and therein and thereby granted and secured as aforesaid, did, after the making of said letters patent, and the execution of the assignment aforesaid, and during the term of time in the said letters patent mentioned, to wit, on the 10th day of November, 1848, and on divers other days and times, and every day between that day and the commencement of this suit, to wit, at the city of Troy, in the State of New York, and in the northern district aforesaid, make, construct, and use, and caused to be made, constructed, and used, and did vend and cause to be vended to others to be used, the said new and useful machine, and a machine and machines embracing and including the principle of the said new and useful machine, so as aforesaid invented by the said Henry Burden, and so as aforesaid secured to him by said letters patent, in violation and infringement of the exclusive right so secured to the said plaintiff by said letters patent and the assignment aforesaid, and contrary to the form of the statutes of the United States in such case made and provided.

And also, for that whereas the said Henry Burden, before and at the time of the granting the letters patent and the committing the grievances hereinafter in this count mentioned, was the original and first inventor and discoverer of a certain other new and useful machine for rolling puddle balls, or other masses of iron in the manufacture of iron, to wit, at the city of Troy, and within the northern district aforesaid; and thereupon heretofore, to wit, on the 10th day of December, in the year 1840, at the city of Washington, upon the application of the said Henry Burden, in due form of law, to the Commissioner of Patents, letters patent were duly issued, in the name of the United States of America, in due form of law, under the seal of the Patent office of the United States, signed by John Forsyth, secretary of State, and countersigned by Henry L. Ellsworth, commissioner of patents, bearing date the day and year last aforesaid, and were duly delivered to the said Henry Burden; which said letters patent, and the said specifications thereto annexed, and forming a part thereof, the plaintiff brings here into court, wherein and whereby granted to the said Henry Burden, his heirs, administrators, or assigns, for the term of fourteen years, from and after the date of the said patent, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said machine, as by the said letters patent, in court to be produced, will fully appear.

And the said Henry Burden afterwards, to wit, on the 10th day of November, 1848, at the city of Troy, and within the northern district of New York aforesaid, by a certain deed of assignment then and there made by the said Henry Burden to the said plaintiff, which said deed, sealed with the seal of the said Henry Burden, the said plaintiff now brings here into court, for the consideration therein mentioned, did assign, transfer, sell, and set over, unto the said plaintiff, all the right, title, interest, and benefit granted and secured to him, the said Henry Burden, by said letters patent; which said deed afterwards, to

wit, in the month of January, 1849, was duly recorded in the Patent office, at the city of Washington, as by reference to the said deed of assignment, and the certificate of the recording thereof therein endorsed, will fully appear.

And the said Henry Burden afterwards, to wit, on the 2d day of February, 1849, at the city of Troy, and within the northern district of New York aforesaid, by a certain deed then and there made by the said Henry Burden to the said plaintiff, which said deed, sealed with the seal of the said Henry Burden, the said plaintiff now brings here into court, for the consideration therein mentioned, did confirm the said grant, assignment, and conveyance of the said 10th day of November, 1848, as aforesaid, and did also, by said last mentioned deed, grant, assign, and convey to the said plaintiff all the rights, privileges, immunities, and property granted and secured to him, the said Henry Burden, by said lettters patent; which said last mentioned deed afterwards, to wit, in the said month of February, 1849, was duly recorded in the Patent office, at the city of Washington, as by reference to the said deed, and the certificates of the recording thereof thereon endorsed, will fully appear.

And the said plaintiff further says, that the said exclusive right so as aforesaid secured to the said Henry Burden by the said letters patent, and assigned by the said Henry Burden to the said plaintiff as aforesaid, has been possessed and used by him, the said plaintiff, since the said assignment, and is of great value to him, the said plaintiff, to wit, of the value of fifty thousand dollars.

Yet the said defendants, well knowing the premises, but contriving and wrongfully intending to injure the said plaintiff, and so deprive him of the profits, benefits, and advantages which he might and otherwise would, have acquired and derived from the said exclusive right of making, using, and vending to others the right of using, the said machine described in said letters patent, and therein and thereby granted and secured as aforesaid, did, after making the said letters patent, and the execution of the assignment aforesaid, and during the said term of time in the said letters patent mentioned, to wit, on the 10th day of November, 1848, and on divers other days and times, and every day between that day and the commencement of this suit, to wit, at the city of Troy, in the State of New York, and in the northern district aforesaid, make, construct, and use, and cause to be made, constructed, and used, and did vend, and cause to be vended to others to be used, the said new and useful machine, and a machine and machines embracing and including the principles of the said new and useful machine so as aforesaid invented by the said Henry Burden, and so as aforesaid secured to him by said letters patent, in violation and infringement of the exclusive right so secured to the said plaintiff by said letters patent, and the assignment aforesaid, and contrary to the form of the statute of the United States in such case made and provided, whereby and by means of which grievances the said plaintiff has been greatly injured and deprived of great gains, profits, and advan-

tages which he might and otherwise would have derived from said invention and the exclusive use thereof, to wit, at the city of Troy, in the State of New York, and northern district aforesaid, and has sustained actual damages to a large amount, to wit, to the amount of five thousand dollars. By means of which said several premises, and by force of the statutes aforesaid, an action has accrued to him, the said plaintiff, to recover the said actual damage, and such additional amount, not exceeding, in the whole, three times the amount of such actual damage, as the court may see fit to order and adjudge. Yet the said defendants, although often requested so to do, have never paid the same, or any part thereof, to the said plaintiff, but have refused, and still do refuse, so to do, to the damage of the said plaintiff of fifteen thousand dollars, and therefore he brings suit, &c.

To the said declaration the said defendants, by David L. Seymour, their attorney, pleaded as follows:

Circuit court of the United States, for the northern district of New York.

ERASTUS CORNING and others ads. PETER A. BURDEN.

And the said defendants, by David L. Seymour, their attorney, come and defend the wrong and injury when, &c., and say that they are not, nor is either of them, guilty of the said supposed grievances afore laid to their charge, or any, or either, or any part thereof, in manner and form as the said plaintiff hath above thereof complained against them; and of this they put themselves upon the country, &c. And the said plaintiff doth the latter, &c.

And issue was thereupon joined between the said plaintiff and the said defendants.

The following notice of special matter was also served by the defendants in the case:

Circuit court of the United States, for the northern district of New York.

ERASTUS CORNING and JOHN F. WINSLOW ads. PETER A. BURDEN.

SIR: Be pleased to take notice that, on the trial of this action, the defendants will, under section fifteen of the act of Congress, passed July 4, 1836, entitled "An act to promote the progress of the useful arts, and to repeal all acts and parts of acts heretofore made for that purpose," give in evidence the following special matter, namely: That the two several letters patent, of the 10th of December, 1840, mentioned in the declaration herein, are one and the same letters patent; that Henry Burden was not the original, or first inventor or discoverer, of the supposed new and useful machine for rolling puddle

balls, or other masses of iron, in the manufacture of iron described in the letters patent in the said declaration mentioned and referred to, or either of the supposed machines described in the said letters patent, and for which the same were granted, or for any part thereof.

That the said Henry Burden was not the original, or first inventor or discoverer, of the invention of preparing the puddler's balls, as they are delivered from the puddling furnace, or other similar masses of iron, by causing them to pass between a revolving cylinder and a curved segmental trough adapted thereto, constructed and operating substantially in the manner of those described in the specification annexed to the said letters patent, and represented in figures 2 and 3 of the drawings accompanying said letters patent and specification. And that he was not the original, or first inventor or discoverer, of the invention of preparing the puddler's balls, as they are delivered from the puddling furnace, or other similar masses of iron, by causing them to pass between vibrating or reciprocating table surfaces or plates of iron, in the manner exemplified in figure 1, in the drawings accompanying said specification; and that he was not the original, or first inventor or discoverer, of the invention of preparing puddler's balls, as they are delivered from the puddling furnace, or other similar masses of iron, by causing them to pass between vibrating or reciprocating curved surfaces, operating upon the principle, and producing a like result, by means analogous to those described in such specification. That the said supposed invention and inventions, for which the said letters patent were granted to the said Henry Burden, was not, and were not, nor was either of them at the time of granting the said letters patent, a new invention or inventions; but that, on the contrary, the method of squeezing out the impurities from, and of reducing or working puddle balls by rolling, had long prior to the date of the said Henry Burden's alleged invention and inventions, and long prior to the application of the said Henry Burden for his said letters patent, been known, and used, and practised, by the use of machines which were, and are, called roughing rolls, or nobbling rolls; which method, and which machines, were constructed upon the supposed principle, and embraced the same improvements and inventions, for which the said letters patent were granted to the said Henry Burden, and were and are used for substantially the same purposes. And the same had been used in the years 1830 and 1831, at the city of New York, by Edward Dunscombe, of that place, and at his rolling mill at that place; in the year 1838 at Troy, in the State of New York, by the defendants, at their rolling mill, in the immediate vicinity of the plaintiff's residence and his place of business; in the years 1835, 1836, and 1837, at Boston, in the State of Massachusetts, by the Boston Iron Company. And that the same were in common use and well known in the iron works, both in the United States and in Great Britain, from the year 1820 to the year 1840; and these defendants intend to prove that a knowledge of such use of the same as aforesaid, and where the same was used, was long prior to the year 1840 possessed by Charles M. Keller, of the city of New York; by Ralph Crooker, of Boston and of Roxbury, Massachusetts; by John

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Snyder, of Troy, New York; by William P. Many and Addison Low, both of Albany, New York; by George Odiorne, of Medford and of Boston, Massachusetts; by Richard Borden, of Fall River, Massachusetts; by Stephen Chubbuck, of Wareham, Massachusetts; by John Simmons, jun., and William Burtt, both of Saugerties, New York; by Philip Borden, of Fall River, Massachusetts; by Increase Robinson, of Wareham, Massachusetts; by Charles Robinson, of Taunton, Massachusetts; by Henry Brevort, of East Boston, Massachusetts; and by Thomas Osgood and David Perry, both of Troy, New York.

And further, that the mode of preparing substances, by causing them to pass between vibrating or reciprocating tables, surfaces, or plates, substantially in the manner, and upon the principle exemplified in figure 1, in the drawing accompanying the said specification of the said letters patent to said Henry Burden, and also the mode of preparing substances, by causing them to pass between vibrating or reciprocating curved surfaces, operating upon the principle, and producing a like result by means analogous to those described in said specification, have been employed since the year 1819 by Dr. Henry James, of Waterford, in the State of New York, in the manufacture of pills, and also since the year 1830 by Leonard Platt and Alfred Platt, both of Waterbury, Connecticut, in milling or rolling machines for milling or rolling the edges of buttons; and also in a pill machine, patented July 10, 1807, by Webster Lewis, of the city of New York, and by other persons for the same and for various other purposes.

And further, that the mode of preparing substances, by causing them to pass between a revolving cylinder and a curved segmental trough adapted thereto, constructed and operating substantially in the manner of those described in the said specification, and represented in figures 2 and 3 of the drawing accompanying said letters patent and specification, had been, long prior to the year 1840, used in wool carding machines in various parts of the United States; and these defendants intend to prove that a knowledge of such use of the same in wool carding machines, and where the same had been used, was, long prior to the year 1840, possessed by William C. Hibbard and Ebenezer A. Lester, of Boston, of South Boston, and of Cambridge, Massachusetts; by Ralph Crooker, of Roxbury and of Boston, Massachusetts; by William Boardman, of Nashua, New Hampshire; and by Simeon Borden and Richard Borden, both of Fall River, Massachusetts.

And further, that the said last named mode had been, long prior to the year 1840, used in agricultural implements, called corn shellers, in various parts of the United States; and these defendants intend to prove that a knowledge of such use of the same in corn shellers, and where the same had been used, was, long prior to the year 1840, possessed by William C. Hibbard, of Boston, Massachusetts; by Ralph Crooker, of Roxbury and of Boston, Massachusetts; and by William Boardman, of Nashua, New Hampshire.

And further, that the said last named mode had been, long prior to

the year 1840, and as early as the year 1808, used in machines for making shot by pressure, in various parts of the United States, particularly in the city of Washington, in the District of Columbia, by Thomas Bruff, and that the same was, and is, fully described and set forth in letters patent of the United States, granted to Thomas Bruff, of Washington aforesaid, for a machine for manufacturing shot by pressure, October 5, 1808, and in other letters patent of the United States, granted to the said Bruff for another machine for manufacturing shot by pressure, June 4, 1813, which two letters patent are recorded in the Patent office at Washington; and these defendants intend to prove that a knowledge of such use of the same in a machine for making shot by pressure, and where the same had been so used, and of the said patent of 1808, was, as early as the year 1811, possessed by Ebenezer A. Lester, of Boston, of South Boston, and of Cambridge, Massachusetts.

And further, that the said last named mode had been, long prior to the year 1840, used in coffee mills in various parts of the United States, and that the same was, and is, fully described and set forth in letters patent of the United States, granted to Hiram Twiss, of Mendon, Connecticut, for a coffee mill, November 19, 1837, which letters patent are recorded in the Patent office at Washington.

And further, that the said last named mode had been, long prior to the year 1840, used in machines for milling the edge of metallic coin, in various parts of the United States, and particularly at Norton, in the State of Massachusetts, and at the mint of the United States in the city of Philadelphia; and these defendants intend to prove that a knowledge of such use of the same in machines for milling the edges of metallic coin, and where the same had been used, was, long prior to the year 1840, possessed by Isaac Babbitt, of Boston, Massachusetts; by Ebenezer Bradbury, of Norton and of Boston, Massachusetts; by George Crocker and William Crocker, both of Taunton, Massachusetts; and by Franklin Peale, of the city of Philadelphia, and superintendent of the mint of the United States at that place.

And further, that the said last named mode had been, long prior to the year 1840, used in milling or rolling machines for milling or forming the edges of buttons, and in machines for finishing or minting the edges of buttons in various parts of the United States, and particularly at Waterbury, in the State of Connecticut; and these defendants intend to prove that a knowledge of such use of the same in milling or rolling machines for milling or forming the edges of buttons, and in machines for finishing or minting the edges of buttons, and where the same had been so used, was, long prior to the year 1840, possessed by Leonard Platt and by Alfred Platt, both of Waterbury, in the State of Connecticut.

And further, that the supposed new and useful machine for rolling puddle balls, or other masses of iron, in the manufacture of iron, described in the said letters patent in the said declaration mentioned, and the inventions described and claimed as new in the said letters patent to said Henry Burden, namely, the invention of preparing the puddlers' balls as they are delivered from the puddling furnace, or other

similar masses of iron, by causing them to pass between a revolving cylinder and a curved segmental trough adapted thereto, constructed and operating substantially in the manner of those described in the specification annexed to the said letters patent, and represented in figures 2 and 3 of the drawings accompanying said letters patent and specification, and the invention of preparing the puddlers' balls as they are delivered from the puddling furnace, or other similar masses of iron, by causing them to pass between vibrating or reciprocating tables, surfaces, or plates of iron, in the manner exemplified in figure 1 in the drawings accompanying the said specification, and the invention of preparing puddlers' balls, as they are delivered from the puddling furnaces, or other similar masses of iron, by causing them to pass between vibrating or reciprocating curved surfaces, operating upon the principle, and producing a like result, by means analogous to those described in said specification; and each of said inventions had, long prior to the date of the said Henry Burden's said alleged inventions, and long prior to the application of the said Henry Burden for his said letters patent, been known, and used, and practised, by the use as aforesaid, of the said roughing rolls or nobbling rolls; and of the said machine for the manufacture of pills, so employed by the said Dr. Henry James; and of the said pill machine so patented by the said Webster Lewis; and of the said wool carding machines; and of the said corn shellers; and of the said machines for making shot by pressure, so patented by said Thomas Bruff; and of the said coffee mill, so patented by said Hiram Twiss; and of the said machines for milling the edges of metallic coin; and of the said milling or rolling machines, for milling or forming the edges of buttons, and of the said machines for finishing or minting the edges of buttons; and these defendants intend to prove that a knowledge of the same respectively, and of such use of the same respectively as aforesaid, and where the same respectively had been used, was, long prior to the year 1840, possessed by the several persons herein before respectively specified; and the defendant will give in evidence, for the purpose of proving the several matters herein before set forth, the several letters patent herein before named, or duly certified copies of the same. And further, that the supposed invention or inventions, claimed in said letters patent to said Henry Burden, had been, anterior to the supposed discovery thereof by the said Henry Burden, described in the following public works, namely, in Brewster's New Edinburgh Encyclopedia, American edition of 1819, volume 11, article Iron, page 477; in the Library of Useful Knowledge, No. 106, on the Manufacture of Iron, published in pamphlet form in London, 1831, under the superintendence of the Society for the Diffusion of Useful Knowledge, at page 20; in Dr. Ure's Dictionary of Arts, Manufactures, and Mines, London edition of 1840, article Iron, subject roughing rolls, page 705; in a Dictionary of Mechanical Science, Arts, Manufactures, and Miscellaneous Knowledge, by Alexander Jamieson, London, 1828, article Iron; in Rees's Encyclopedia, volume 20, article Iron, section 4; in the Encyclopedia Britannica, a Dictionary of Arts, Science, &c., volume 12,

page 437; in Nicholson's Operative Mechanic, London edition, 1825, page 335; and in the Encyclopedia Americana, volume 7, 1831, article Iron, page 72. That the infringement alleged in the declaration to have been committed by the defendants, of the said letters patent to Henry Burden, was committed, if at all, by the use by the defendants of machinery covered and claimed by letters patent of the United States, issued to the defendant, John F. Winslow, on the 18th of December, 1847, for fourteen years from that date, for his invention of a new and useful improvement in rolling and compressing puddlers' balls; such machinery being covered by the claim of the specification to said letters patent of December 18, 1847, which claims the method substantially as described in said specification last named, of compressing or shingling puddlers' balls or lumps of iron into blooms, by the combination of a cam formed compressor and two or more rollers, substantially as described in said specification; and of machinery covered and claimed by letters patent of the United States, issued to the said John F. Winslow, on the 5th day of July, 1848, for fourteen years from that day, for the invention by said Winslow and one John Snyder, of a new and useful improvement in machinery for rolling puddlers' balls, and for which new and useful improvement of said Winslow, he, the said Winslow, has also duly obtained letters patent, issued in and for the kingdom of Great Britain. That the machinery so used by said defendants rolls the puddle balls between a cam formed roller and two cylinders, which so rotate as to retain the balls of iron in the same position, while it is being gradually reduced in size by the cam form of the periphery of one of the rollers, and that the said machinery has none of the essence of the principle contained or defined in any one of the claims of the said letters patent of the said Henry Burden.

That, in the defendants' machinery, the ball of iron is neither rolled between a cylinder and an eccentric concave, nor between vibrating tables, or curved vibrating surfaces, but between a cam formed roller and two revolving cylinders and rollers. That in all the modes claimed in said letters patent to Henry Burden, the ball of iron moves along with the periphery of the cylinder, or with the vibrating tables, or with the vibrating curved surfaces; while in the defendants' machinery the ball turns on its axis simply, and remains in the same position otherwise, and within the reach and observation of the workmen.

That the said letters patent to the said Henry Burden are invalid for multiplicity of claim, claiming as they do at least two machines as distinct inventions, namely, first causing the balls to pass between a revolving cylinder and a curved segmental trough adapted to it, which curved segmental trough is stationary. Secondly, causing the balls to pass between vibrating or reciprocating tables, surfaces or plates, or between reciprocating curved surfaces, operating upon the same principle; that if the said Henry Burden had been the first to invent the general principle of working or reducing puddlers' balls by rolling them, he could, under the 6th section of the act of July 4, 1836, have described various modes in which he had contemplated the application of the principle,

and made claim to them; but that the principle of reducing puddlers' balls by rolling, not having been new at the time of the granting of said letters patent to said Burden, the same were issued for more than one modification of such general principle, and for more than one invention, and are therefore invalid.

And the said defendants will give in evidence the said act of July 4, 1836, and will insist that judgment be rendered for them herein with costs. September 15, 1849.

Yours, &c., D. L. SEYMOUR,
Defendants' attorney.

To S. STEVENS, esq., *Plff's att'y.*

And afterwards, to wit, at a circuit court of the United States, for the northern district of New York, held at the court house in the village of Canandaigua, in said district, on the fifth day of July, in the year of our Lord one thousand eight hundred and fifty, before the honorable Alfred Conkling, one of the judges of the said court, the aforesaid issue, so joined between the said parties as aforesaid, came on to be tried by a jury of the said district for that purpose duly empannelled, good and lawful men of the said district; at which day came there as well the said plaintiff as the said defendants, by their respective attorneys aforesaid; and the jurors of the jury aforesaid, empannelled to try the said issue being called also came, and were then and there in due manner chosen and sworn to try the said issue; and upon the trial of the said issue, the counsel for the said plaintiff offered to read in evidence letters patent of the United States, granted to Henry Burden, of Troy, New York, dated December 10, 1840, for "a new and useful machine for rolling puddle balls, or other masses of iron, in the manufacture of iron," together with the specification and drawings thereto annexed. The said letters patent and specification were in the words and figures following, to wit:

No. 1890.

THE UNITED STATES OF AMERICA.

To all whom these letters patent shall come:

Whereas Henry Burden, Troy, New York, has alleged that he has invented a new and useful machine for rolling puddle balls, or other masses of iron, in the manufacture of iron, which he states has not been known or used before his application; has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said machine, and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in the said machine, and praying that a patent may be granted for that purpose:

These are therefore to grant, according to law, to the said Henry Burden, his heirs, administrators or assigns, for the term of fourteen

years from the tenth day of December, one thousand eight hundred and forty, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said machine, a description whereof is given in the words of the said Henry Burden in the schedule hereunto annexed, and is made part of these presents.

In testimony whereof, I have caused these letters to be made patent, and the seal of the Patent office has been hereunto affixed.

Given under my hand, at the city of Washington, this tenth day of December, in the year of our Lord one thousand eight hundred and forty, and of the independence of the United States of America the sixty-fifth.

JOHN FORSYTH,
Secretary of State.

[L. S.] Countersigned, and sealed with the seal of the Patent office.
HENRY L. ELLSWORTH,
Commissioner of Patents.

THE SCHEDULE REFERRED TO IN THESE LETTERS PATENT, AND MAKING PART OF THE SAME.

To all whom it may concern :

Be it known that I, Henry Burden, of the city of Troy, in the county of Rensselaer, the State of New York, have invented an improvement in the process of manufacturing iron; which improvement consists in the employment of a new and useful machine for the rolling of puddlers' balls, or balls prepared in the puddling furnace, and of other similar masses of iron; by which rolling they are more perfectly and rapidly prepared for the process of being drawn out into bars by means of the rollers ordinarily employed for that purpose, or under the tilt-hammer. My rolling machine dispenses with the shingling or other methods heretofore adopted of preparing the blooms for being drawn out into bars. The puddler's ball is conveyed into my machine immediately from the puddling furnace, and it is therein rolled down and elongated between two plane or curved surfaces, and made to assume a cylindrical form; a progressive motion being given to one or both of these surfaces during the time the mass of metal is between them, so as to cause the ball to roll over and over, separating from it a large portion of the cinder and other foreign matter, reducing it in diameter, and finally delivering it in a cylindrical form. The machine, as I now construct it, consists of a cast iron cylinder, which may be from four to six feet in diameter, and three feet, more or less, wide; said cylinder being in part surrounded by a trough-like stationary concave, sufficiently distant from it at one end to admit the puddler's ball, and gradually approaching nearer and nearer to it along its whole length, until it arrives at the point at which the bloom is delivered in a state ready for the subsequent operations of the manufacture.

To exemplify the principle upon which my machine operates, I will (before describing it more particularly in the form in which I now use it) show it in that in which my first essays were made, and which I

have represented in a figure 1 in the accompanying drawings. In this, fig. A represents a crank, having a throw of four our five feet, and attached by a shackle bar to a wedge-form piece of cast iron, B, of corresponding length, and of sufficient width for the formation of the bloom. The piece B is supposed to be sustained, and to slide against the stationary guide or top piece C, and above the bed piece D. If, in the position represented, a puddler's ball E be placed between B and D, it will, by the revolution of the crank, be rolled over and over; will be reduced in diameter; be brought into and delivered in a cylindrical form as shown by the end view of it at F.

Figures 2, 3, and 4, represent my machine in the form in which I now construct it; and in each of the figures the same letters of reference are used to designate like parts. Fig. 2 is a side view, fig. 3 a front view, and fig. 4 a diagram showing the relationship of the cylinder, and concave to each other. G G is the frame work of the machine, which may be made of cast iron. H is a cylinder of cast iron, which is to revolve in said frame, and which may be from four to six feet, more or less, in diameter, and three feet, more or less, wide. The surface of this cylinder may be even, or it may be furnished with protuberances on its periphery, for the purpose of giving a kneading motion to the particles of the mass which is rolled, should this be preferred. I is a curved segmental trough of cast iron, which partially surrounds the cylinder, and which is firmly attached to the frame G G. A ball of puddled iron J is represented as entering the mouth of the trough I I; the form given to the trough or concave at that part being that of a semicircle at its upper portion, and having parallel sides near to the cylinder. The curved trough becomes wider and shallower throughout the circuit intended to be given to the ball, until at its termination or point of delivery K, its back I″ is parallel with the cylinder; while its sides or flanges I I′′′′ are so shaped as to act upon and upset the ends of the bloom, which is consequently delivered in a cylindrical form, such as is represented at J′′′, fig. 2. In the diagram figure 4, the line H represents the outline of the cylinder; the line I I I, that of the interior of the trough in a section along its middle, showing how the ball J must necessarily and progressively be reduced in its diameter as seen at the middle J′, and until at J″ it makes its escape in the form of a cylinder. L is the driving shaft of the machine, which carries two pinions, one of which is shown at M (fig. 2,) meshing into the cog wheel N on one end of the cylinder; each end of the cylinder being similarly furnished with a cog wheel, as shown in fig. 3. The second pinion, similar to M, is hidden by the other parts of the machine. O O is the shaft of the cylinder H, supported upon proper bearings.

In my establishment, the puddling furnace is situated several feet above my machine for rolling the balls; and they are therefore most conveniently fed to the machine down an inclined plane, represented by the line P, fig. 2; but in many, and probably most situations, it will be more convenient to feed them in below and deliver them above,

reversing the segmental trough for that purpose. The segment may also be made to surround nearly or quite three-fourths of the cylinder, only allowing sufficient space for the convenient entrance and delivery of the blooms. The cylinder may, if preferred, be made to revolve horizontally; the only change, required in this case, would be the turning the machine down on one side, and the adapting the driving parts thereto.

It will be readily perceived also by the skilful machinist, that the principle upon which I proceed may be carried out under various modifications, of which I have given two examples, and these might be easily multiplied; but this I do not think necessary, as I believe that those which have been given must suffice to show in the clearest manner the nature of my invention, and to point out fully what I desire to have secured to me under letters patent of the United States.

Having thus fully made known the nature of my said improvement, and explained and exemplified the manner in which I construct the machinery for carrying the same into operation, what I claim as constituting my invention, and desire to secure by letters patent, is the preparing puddler's balls as they are delivered from the puddling furnace, or of other similar masses of iron, by causing them to pass between a revolving cylinder, and a curved segmental trough adapted thereto, constructed and operating substantially in the manner of that herein described, and represented in figures 2 and 3 of the accompanying drawings; or, by causing said balls to pass between vibrating or reciprocating tables, surfaces, or plates of iron, in the manner exemplified in figure 1 in the accompanying drawings; or between vibrating or reciprocating curved surfaces, operating upon the same principle, and producing a like result by analogous means.

In testimony whereof I hereunto set my name, this eighteenth day of August, in the year 1840.

H. BURDEN.

Witnesses:
THOMAS P. JONES,
GEORGE WEST.

(The original or a certified copy of said letters patent, specification, and drawings may be produced and used by either party on any argument to be had on this bill of exceptions.)

To the reading of the said letters patent, specification, and drawings in evidence, the counsel for the defendants then and there objected, on the ground that the said letters patent were void for multiplicity of claim, because they claimed at least two separate machines as distinct inventions, namely, first, causing the balls to pass between a revolving cylinder and a stationary curved segmental trough; and secondly, causing them to pass between vibrating or reciprocating tables, surfaces, or plates, or between vibrating or reciprocating curved surfaces, operating upon the same principle. But the said judge did then and there declare and deliver his opinion, that the said objection, so taken by the

said counsel for the said defendants ought not to be allowed, but that the said letters patent, specification, and drawings ought to be read in evidence, and did accordingly decide that the same should be read in evidence; to which said opinion and decision of the said judge the said counsel for the said defendants did then and there on behalf of the said defendants except, and the said letters patent, specification, and drawings were read in evidence on the part of the said plaintiff.

The counsel for the plaintiff then read in evidence an instrument in writing, bearing date February 2, 1849, executed by said Henry Burden, assigning to the plaintiff all the interest of the said Henry Burden in the said letters patent, and recorded in the Patent office at Washington, February 6, 1849.

The counsel for the plaintiff then read in evidence the deposition of Edmund Burke, in the words and figures following, to wit:

Circuit court of the United States, for the northern district of Yew York.

PETER A. BURDEN
vs.
ERASTUS CORNING AND JOHN F. WINSLOW.

I, Edmund Burke, being duly sworn and cautioned to tell the whole truth, depose and testify as follows:

Question 1. What is your age; where do you reside; what is your profession or occupation?

Answer. My age is forty years and upwards; I reside in the city of Washington, in the District of Columbia. I was educated to the profession of the law, which I practised from the spring of 1830 until nearly five years ago, when I was appointed Commissioner of Patents of the United States, which office I filled from May 5th, 1845, to May 19th, 1849. I am now one of the editors of the Union newspaper, published in the city of Washington.

Question 2. Are you acquainted with the process of reducing puddlers' balls or similar masses of iron into blooms?

Answer. I am, theoretically, but not practically.

Question 3. Are you, or are you not, acquainted with the machine patented to Henry Burden, on the tenth day of December, A. D. eighteen hundred and forty, styled a "machine for rolling puddlers' balls or other similar masses of iron in the manufacture of iron?"

Answer. I am; but I have derived my knowledge of it from the model, drawings, and specification, as set forth in his patent.

Question 4. Have you, or have you not, ever known, read, or heard of the process which the ball undergoes in the machinery prior to its use by Mr. Burden, or of any contrivance of carrying this process into effect the same in principle as the said machinery?

Answer. I have never heard nor known of the process, nor of any machine for effecting it.

Question 6. Have you, or have you not, ever seen a model of the

machinery described and represented in the drawings and specification referred to in the preceding interrogatory?

Answer. I have seen a model which was shown to me by Henry Burden, and by him stated to be a model of his machine, and that model is upon scales, marked B, figures 2, 3, and 4. While I was Commissioner of Patents, I once gave the drawings and specification of Mr. Burden's patent a careful and critical examination.

Question 7. Do you know what method was used to reduce puddlers' balls into bloom, prior to the introduction of Mr. Burden's machinery? If so, describe them.

Answer. I know of none except those described in various books upon the subject of the manufacture of iron, which I should nearly transcribe, or give the substance of them, if I was to answer this interrogatory more fully.

Question 8. Does or does not Mr. Burden's machine effect a saving over the most economical method previously known? If it does, state what that saving will amount to on each ton of iron manufactured.

Answer. My practical knowledge of the manufacture of iron will not enable me to answer this question.

Question 9. Look at the drawing and description marked A, herewith shown to you, and state what they purport to represent and describe; and if you say that they represent and describe a machine for rolling or reducing puddlers' balls into blooms, state what is your opinion on these points, if any, or where it coincides in principle and mode of operation with, or differs from, the machinery described in the specification and drawing herewith shown to you.

Answer. The drawing and description marked A, hereto annexed, purport to represent a machine for reducing puddlers' balls into blooms, recently adopted by Erastus Corning and John F. Winslow, at the Albany iron works. In my judgment, this machine contains the essential new principle involved in the process of reducing puddlers' balls into blooms, described in the specification of Henry Burden's patent. A copy of that specification, and diagrams representing the drawings, are hereto annexed, marked B; or, rather, the paper purports to be a copy of said specification and drawings. As I understood Mr. Burden's invention, the great distinctive principle involved in it, and which constitute its prominent and striking features of originality, is the reduction of a puddler's ball to a bloom by mechanical pressure, kept constantly and equally on till the ball is reduced in size and form, until it comes out of the machine a perfect bloom, as it is called in the technical language of the art. This I regard as the real and true invention of Mr. Burden. The paper annexed, marked B, describes the several mechanical processes by which the object of the invention is accomplished. Figure 1 represents the most simple of those mechanical processes. Its peculiar form and constitution are particularly set forth in the specification of Mr. Burden in the paper annexed, marked B, and need not be more particularly described by me. It is sufficient to say that the bottom or bed piece "C," as represented in

the diagram, is a level horizontal plane. The under surface of the moving part, marked on the diagram "B," is also a plane inclined to the upper surface of bed piece "C," before mentioned. Its motion is horizontal, and of course reduces the puddler's ball marked "E" on the diagram, (which rotates as the moving plane progresses,) by a pressure kept continually equal as the ball becomes reduced in diameter and elongated; in other words, by the constant and equal approximation of the two plane surfaces between which the ball is placed, which constantly approach each other at the very point at which the centre of the ball is placed. This process is continued by the means described, until the ball is delivered from the machine a perfect bloom.

The machine and its various parts, represented by figures 2, 3, and 4, on paper annexed hereto, marked "B," is, in my judgment, but a modification of the machine above described. The two machines are identically the same in the great leading principle of the invention. The prominent parts of figure 3 are a revolving cylinder, marked "H," and an upper segmentary surface or plate, marked "I" "I," concave at the commencement, but constantly spreading to a plane surface, and constantly approximating to the surface of the cylinder to the point of the delivery of the bloom, marked "K" in the same figure. The puddler's ball, "J," is put in the mouth of the concave, or "trough," as it is called in the specification. The cylinder "H" is then made to rotate by adequate mechanical force, which causes the ball "J" also to rotate upon its axis, and consequently progresses between the surface of the trough and the surface of the cylinder to the place of delivery. Of course the space between the surface of the trough and the surface of the cylinder is reduced in depth, while it expands tolerably as the ball progresses, thus keeping upon it a constant and uniform pressure, giving, at the same time, room for its elongation, until it is delivered at "K" a perfect bloom. As the construction of this machine, in its modified forms and its modes of operation, are particularly described and set forth in the specification and diagram of Mr. Burden, in paper hereto annexed, marked "B," it is unnecessary for me to describe them any further than is necessary to enable me to give a clear idea of the character and principle of the invention. In the machine described in paper marked "B," hereto annexed, and said to be used by Erastus Corning and John F. Winslow, the same essential general principle predominates which distinguishes the machine of Mr. Burden before described, and which, in my judgment, constitutes the invention covered by Mr. Burden's patent. The prominent parts of Mr. Winslow's machine are a cam formed compressor, marked "a" in the various diagrams represented on paper hereto annexed, marked "A," and two rotating cylinders, marked "b b" on the same paper, operating as set forth in the description on the same paper. The puddler's ball "d," in figure 1, represented on the paper last mentioned, is placed between the compressor at the point of the surface nearest the journal "e," and between the rollers "b b," and is reduced and elongated by a pressure kept constant and equal, as the ball or bloom is reduced in diameter

by the rotation of the compressor. This is effected by the constant and equal recession of the periphery of the compressor from the journal "e."

Now, as I have before stated, I referred the true gist, or prominent and essential principle of the invention of Mr. Burden before described, to be the constant and equal pressure produced by adequate mechanical devices upon the puddler's ball, from the commencement to the end of the process by which it is converted into a bloom. The grand idea in it is the constant and equal approximation of the horizontal and inclined planes, as described in figure 1, on the paper hereto annexed, marked "B," or of the surface of the concave or trough, and the surface of the cylinder, as represented in figures 2, 3, and 4, on the same paper marked "B." They are but equivalent mechanical constructions of well known parts of mechanism for accomplishing that end, or carrying out the idea of the inventor. The invention or improvement patented to Mr. Winslow is, in my judgment, the same in principle as that which was patented to Mr. Burden. The great feature of the two machines is precisely the same, namely, the reduction of the puddler's ball to a bloom by a constant and equal pressure produced by opposite surfaces constantly and equally approximating as the ball is reduced in diameter and increased in length, until it arrives at the state of a perfect bloom. This is effected by Mr. Burden by various mechanical devices, which must be regarded as equivalents, as they are but well known pieces of mechanism performing precisely the same surface.

And such is the character of Mr. Winslow's machine, as represented and described on paper hereto annexed, marked "A." He has made use of well known parts of mechanism for carrying out precisely the same idea or invention as that of Mr. Burden. In my judgment, all the devices before described and referred to, as well those of Mr. Burden as that of Mr. Winslow, are essentially the same in principle, and must be regarded as mechanical equivalents for effecting the same object.

The counsel for the plaintiff then read in evidence the deposition of Peter H. Watson, in the words and figures following, to wit:

In the circuit court of the United States for the northern district of New York.

PETER A. BURDEN
vs.
ERASTUS CORNING and JOHN F. WINSLOW.

I, Peter H. Watson, being duly sworn and cautioned to testify the whole truth, reply to the several interrogatories herein stated, the answers thereunto respectively appended, as follows:

Question 1. What is your age; where do you reside; what is your profession and occupation?

Answer. My age is thirty years and upwards. I reside in the city

of Washington, in the District of Columbia. I am a practical machinist, but for some time past have been practising the profession of patent attorney.

Question 2. Are you acquainted with the process of reducing puddlers' balls, or other similar masses of iron, into blooms?

Answer. I am.

Question 3. Are you or are you not acquainted with the machinery patented to Henry Burden, the tenth day of December, A. D. eighteen hundred and forty, styled a "machine for rolling puddlers' balls or other similar masses of iron in the manufacture of iron?"

Answer. I am.

Question 4. Have you or have you not ever known, read, or heard of the process which the ball undergoes in this machinery prior to its use by Mr. Burden; or of any contrivance for carrying this process into effect, the same in principle as the said machinery?

Answer. I have never known, read, or heard of the process, nor of any machine for carrying it into effect.

Question 5. Examine the drawings and specifications marked "No. 1," herewith shown to you, and state what they purport to represent and describe; say, also, whether they are or are not sufficiently explicit to enable a mechanic skilled in the art of manufacturing iron to construct the machinery represented and described thereby.

Answer. They purport to be a copy of the specifications and drawings of a patent granted to Henry Burden, of Troy, in the county of Rensselaer, and State of New York; they describe and represent an improvement in the process of manufacturing iron, and exemplify and explain suitable machinery for carrying the same into effect. The specifications and drawings furnish all the information necessary to enable an intelligent mechanic, conversant with the manufacture of wrought iron, to construct and put in operation the machinery they describe and represent.

Question 6. Have you or have you not ever seen a model of the machinery described and represented in the drawings and specifications referred to in the preceding interrogatory?

Answer. I have examined a model, labelled "No. 1," of the machine represented by figures 2, 3, and 4, of the said drawings, exhibited to me by Henry Burden.

Question 7. Do you know what methods were used to reduce puddlers' balls into bloom prior to the introduction of Mr. Burden's machinery? If so, describe them.

Answer. There were several methods of performing the operation. One of these methods consisted in forging the ball into the desired shape on a large solid anvil, by a massive hammer worked by steam or other power, the ball being held with a pair of tongs by an attendant, who rolled it a little between every blow, to bring all its sides in succession under the direct action of the hammer, and thereby preserve the symmetry of the mass of metal during its elongation.

A second of these methods consisted in placing the ball between the

jaws of a pair of ponderous forceps, (called alligator squeezers,) kept opening and shutting by steam or other power; the ball being rolled a little by an attendant every time the jaws opened, to subject all its sides in succession to the direct action of the squeezers, until it was reduced to a bloom of the required proportions.

A third method was to pass the ball repeatedly through between a pair of large grooved metal rolls, revolved by power; it being returned again to the rolls, after each passage between them, by attendants, who, with their tongs, turned it every time it was entered, so as to bring all its sides in succession under direct compression, and thus give to the bloom as symmetrical a form as possible.

The elongation of the mass of metal being at right angles to the axis of the rolls between which it was compressed and extended, and in the direction of its own progressive motion between them.

The ball, in this case, was not rolled or rotated on its own axis while under compression.

Question 8. Does or does not Mr. Burden's machine, before referred to, effect a saving in the manufacture of iron over the most economical method previously known? If it does, state what that saving will amount to on each ton of iron manufactured.

Answer. Mr. Burden's machine does effect a very considerable saving, but I do not know the expense of making blooms with sufficient exactness to state definitely the amount saved.

Question 9. Look at the drawings and descriptions marked No. 2, herewith shown to you, and state what they purport to represent and describe; and if you say that they represent and describe a machine for rolling puddlers' balls into blooms, state what, in your opinion, are the points, if any, in which it coincides in principle and mode of operation with, or differs from, the machinery described in the specifications and drawings marked "No. 1" herewith shown to you.

Answer. The drawing and description marked "No. 2," and hereto appended, purports to represent and describe a machine for rolling puddlers' balls into blooms, and said to be in use by Erastus Corning and John F. Winslow, at the Albany iron works, Troy, New York. I can best explain wherein this machine is like or unlike the machinery described and represented in the description and drawings marked "No. 1," and hereto appended, by explaining the structure and principle of operation of both, and in what respect they are an improvement upon machines previously used for the same purpose.

The paper marked "No. 1," or specifications of Henry Burden's patent, is not confined to the description of any particular form of machine or machines, but describes a new method or process of reducing puddlers' balls to blooms, more economical and advantageous than the methods previously known, and also describes different machines by which this process may be practically carried into effect. These machines scarcely resemble each other in general form and arrangement, but, nevertheless, operate upon one common principle, treating the ball in the same manner and with the same results; and they are a very

good exemplification of the exceedingly wide range of difference in the configuration and disposition of parts which the machinery admits of, without essentially changing either the mode or result of its operation. This new process of reducing puddlers' balls to blooms, consists in rotating the ball on its axis under continuous compression, until it is elongated to the required extent; both the turning of the ball and its compression being done simultaneously, and by self-acting machinery. In all former processes, both the rolling of the ball and its compression were always intermittent and alternate, and the rolling done by attendants, and not by the machine.

This new principle or mode of operation, which characterizes the machinery of Mr. Burden, is equally characteristic of the machine of Messrs. Corning & Winslow, described in the appended paper marked "No. 2." I therefore consider the two machines identical in principle and purpose.

In figure 1, of the appended paper "No. 1," Mr. Burden represents the most simple form of machinery by which his process could be carried into effect. D being a metal block, whose upper surface is plane, and B, another metal block, whose under surface is plane and inclined to the upper surface of D, but at such a distance therefrom that, at its converging end, the space between them will be just equal to the diameter of a finished bloom, while at its diverging end the space will be sufficient to admit a rough puddle ball. These blocks are secured in a strong frame, one above the other, and in such a manner that the inclined block or compressor B is free to move backwards and forwards in a plane parallel to the face of the lower block or support D, but so as to preserve its inclination thereto. If motion was given to the compressor in the direction of the arrow, its under surface would move obliquely against a puddle ball E, placed between it and the support, and, in passing over the ball, would roll it through from the wide to the narrow end of the space between the compressor and support; and as the ball is plastic, it will progressively change its shape and proportions, lessening its diameter and extending its axis as it moves along, so that when that part of the face of the compressor which approaches nearest to the support has passed over it, it will then be reduced to the requisite proportions for a bloom. In case an equal progressive motion, in opposite directions, was given to the surface of both the compressor and support, (as is suggested in the specifications,) the ball would remain between them without any other motion than a rotation on its own axis; but it would be compressed and elongated precisely as in the first case, by the gradual reduction of the distance between those points of the compressor and support, between and in contact with which it rolls. It is not, therefore, in any respect material to the result, whether the compressor and support both move, or only one of them moves; and only involves a question of convenience, economy, or expediency, for the consideration of the constructor. By bending the support D into a cylindrical form, as seen at H, (figs. 2, 3, and 4,) and causing it to revolve on an axis L, and making the compressor B stationary,

and causing it to assume a curved form converging toward the cylinder as seen at III, the stationary compressor and the moving support would be placed and operate in a manner the converse of the first arrangement, but would perform precisely the same duty. If both this compressor and support moved in concentric circles, with equal velocity and in opposite directions, or with different velocities and in the same direction, they would still operate upon the puddle ball in the same manner, and with the same results, viz., they would elongate the ball, by rolling it under continuous compression between two approaching surfaces.

The machine represented in figures 1, 2, and 3, of the appended sheet marked "No. 2," consists of a wedge shaped compressor B, (like that represented in figure 1 of Henry Burden's specifications,) which is bent upon and secured to the circumference of a revolving cylinder, or made in one piece therewith; and of a support beneath the compressor, consisting of two revolving rolls, D′D″, to support the puddlers' ball, and assist in rolling it while being compressed. When the compressors and support are turned in the direction of the arrows, the face of the compressor during each revolution, commencing at the point nearest its own axis, will gradually approach towards the supporting rolls; and a puddle ball, d, placed between them in the position seen in figure 2, would be continually rotated on its axis, and gradually compressed until reduced in diameter, and elongated into the form seen at c, (figures 3, 4, and 5,) required for the finished bloom; one end of the bloom being upset by a flange on the end of one of the rolls of the support, and the other by a spring-hammer, p, worked by a face camb c.

The machine described by Henry Burden in the appended paper, marked "No. 1," upset both ends of the bloom by flanges on the compressor; and, in this respect, operates differently from the machine of Corning & Winslow, where one end of the bloom is upset by a hammer and the other by a flange. In one of Burden's machines, the support consists of one large revolving roll, while Corning & Winslow use two small rolls for the same purpose; but as the two small rolls merely support and aid in rotating the ball, and as the one large roll performs precisely the same duty, they can be considered nothing more than mere variations of the same device, and not differing in any essential respect.

The compressor of Henry Burden's machine is in one case stationary, and in the other moveable; but his specifications state that either or both may be made to move, both be curved or plane, and that those he has represented are merely designed as examples of two out of the various modifications of machinery that could be made to work upon the same principle. The compression of Corning & Winslow's machine is of the curved variety spoken of in Burden's specification, and his support belongs to the same class.

The specification of Burden states that the surfaces of either the support or compressor, or both, may have motion given to them during the

time the mass of metal is between them, and Corning & Winslow have adopted the latter plan.

Corning & Winslow's machine is, therefore, in every thing relating to the compression and elongation of the ball of metal, the same in principle and mode of operation as those described in Burden's specifications; and it differs from Burden's in no other respect than in the upsetting of one of the ends of the bloom by means of a hammer, and the other by a flange, while Burden's upsets both ends of them by flanges.

P. H. WATSON.

The counsel for the plaintiff then read in evidence the deposition of William P. Elliot, in the words and figures following, to wit:

I, William P. Elliot, of the city of Washington, District of Columbia, being duly sworn, and cautioned to testify the whole truth, reply to the several interrogatories herein stated, the answers thereunto respectively appended, as follows:

Question 1. Where do you reside; what is your profession and occupation?

Answer. I reside in the city of Washington; my profession is that of an architect and civil engineer, and patent agent; which profession I have practised in the city of Washington during the last twenty years.

Question 2. Are you acquainted with the process of reducing puddlers' balls, or other similar masses of iron, into blooms?

Answer. I am, theoretically, but not practically.

Question 3. Are you or are you not acquainted with the machinery patented to Henry Burden the tenth day of December, 1840, styled a "machine for rolling puddlers' balls," or "other similar masses of iron, in the manufacture of iron?"

Answer. I am acquainted with Henry Burden's machinery for rolling puddlers' balls, or other similar masses of iron, in the manufacture of iron.

Question 4. Have you or have you not ever known or read, or heard, of the process which the ball undergoes in this machinery, prior to its use by Mr. Burden; or of any contrivance for carrying this process into effect, the same in principle as the said machinery?

Answer. The first knowledge I ever obtained of the process of rolling puddlers' balls into cylindrical blooms, in a space which is gradually reduced in its diameter, and elongated in the line of its axis by compression, was from the patent of Henry Burden, dated on the tenth day of December, 1840.

Question 5. Examine the drawing and specification marked No. 1, herewith shown to you, and state what they purport to represent and describe. Say also whether they are or are not sufficiently explicit to enable a mechanic, skilled in the art of manufacturing iron, to construct the machinery represented and described thereby.

Answer. I have examined the drawings and specifications marked No. 1, and find that they purport to represent and describe a machine

for rolling puddlers' balls into blooms. I believe the drawings and specifications are sufficiently clear to enable a mechanic, skilled in the art of manufacturing iron, to construct the machinery represented and described.

Question 6. Have you or have you not seen a model of the machinery described and represented in the drawings and specifications referred to in the preceding interrogatory?

Answer. I have seen such a model; I believe it was marked No. 1, and was shown to me some time ago by Henry Burden; it corresponded with the figures 2, 3, and 4, of the annexed sheet of drawings, marked No. 1.

Question 7. Do you know what methods were used to reduce puddlers' balls into blooms, prior to the introduction of Mr. Burden's machinery? If so, describe them.

Answer. The methods employed prior to the introduction of Mr. Burden's machinery, were by "the forge hammer," "the anvil and tongs," "the alligator squeezers, anvil, and tongs," and "the grooved rollers and tongs."

Question 8. Does or does not Mr. Burden's machinery effect a saving over the most economical method previously known? If so, state what that saving will amount to on each ton of iron manufactured.

Answer. The use of Burden's machinery effects a great saving in the manufacture of iron, over the most economical methods previously known and used; but to what amount on each ton of iron manufactured, I am unable to state with precision.

Question 9. Look at the drawings and description marked No. 2, herewith shown to you, and state what they purport to represent and describe; and if you say they represent and describe a machine for rolling and reducing puddlers' balls into blooms, state what, in your opinion, are the points, if any, in which it coincides in principle and mode of operation with, or differs from, the machinery described in the specifications and drawings marked No. 1, herewith shown to you.

Answer. I have examined the machine of John F. Winslow, represented on the before named paper marked No. 2, and find that it contains the essential principle described in the patent of Henry Burden, and designed to effect the same object, namely, the reduction of puddlers' balls and other masses of iron into blooms. The patent of H. Burden, I believe, describes as one of his "various modifications," that the compressor and support between which the puddlers' ball is rolled down and elongated into a cylindrical bloom, may both have a "progressive motion during the time the mass of metal is between them, so as to cause the ball to roll over and over, separating from it a large portion of the cinder and foreign matter, reducing it in diameter, and finally delivering it in a cylindrical form."

"It also states that the surface of the compressor may be furnished with protuberances on its periphery for the purpose of giving a kneading motion to the particles of the mass which is rolled.

It therefore appears to me that the modifications of Henry Burden's

patented machinery for rolling puddlers' balls, or other masses of iron, said to have been recently adopted by Erastus Corning and John F. Winslow, at the Albany iron works, and as delineated on the printed paper marked No. 2, is substantially the same as that described in the patent of Henry Burden, described and represented on the paper marked No. 1.

The result produced by the revolving wedge-shaped compressor or cam, and rotating support, represented on paper No. 2, is the same as that produced by the vibrating wedge-shaped compressor and reciprocating support represented on the printed paper No. 1; also in the revolving compressor and stationary support shown on the same sheet No. 1, namely, the gradual reduction of a spherical or other shaped mass of iron, to the form of a cylindrical bloom, in a space which is gradually reduced by the gradual approach of the surfaces of the compressor and the support from the point where the puddler's balls, or irregular mass of iron, is first introduced, to the point where it is finally discharged in the form of a cylindrical bloom; it being immaterial whether the support or the compressor be made to revolve or reciprocate, one or both, at the same time, the principle and purpose of the several machines being identical. The ribbed rolls, D1, D2, used in Winslow's machine, are mere mechanical equivalents employed as a substitute for Burden's moveable rest D, fig. 1, sheet 1. Burden employs two flanges to "upset" the ends of the bloom, as shown in fig. 3, sheet No. 1. Winslow uses one flange and a spring-hammer to accomplish the same object, as shown in fig. 1, sheet No. 2. Winslow's apparatus for "upsetting" the ends of the bloom, appears to differ from Burden's in the particulars above stated, and represented in the sheets of drawings No. 1 and 2, hereunto annexed.

WM. P. ELLIOT.

The counsel for the plaintiff then called as a witness James Warr, who being duly sworn testified as follows:

I live at the nail factory near Troy; at the present time I am scrapping in the iron business; I have worked in the iron business 25 years, both in this country and in England; I work now for the plaintiff; during a part of 1837 I worked for Mr. Winslow, one of the defendants, about two months; during the remainder of 1837 I worked in Pennsylvania. (A model of a machine with a revolving cylinder, and a curved stationary segmental trough, like that described in said specification of Henry Burden, was here shown to the witness.) This is a model of Mr. Burden's squeezer; I first saw a machine like this in the fall of 1839, I believe; this model is marked No. 1; I first saw the machine when it was newly put up in Mr. Burden's iron works; when I first saw it they were fixing it up to start it; I believe they had not then used it at all; I did not see it start; I was told it was going to start, and went up to see it; I was working for Mr. Winslow then; Mr. Winslow's works are 300 or 400 yards distant from Mr. Burden's, on the same creek, just below; a number of men who were working

for Mr. Winslow were at Mr. Burden's establishment with me at that time; I did not stop to see the machine start then; Mr. Burden ordered us out; he said he did not want any of Winslow's men there to see it start; I turned around to those who were with me, and said to them, that we had better go out; we went out, and the doors were locked. Mr. Burden told us that if we would come up the next day he would show the machine to us, after he had tried it. He said we would all see it after he had tried the experiment; I did not go up for a couple of months after; I then went up, and saw it in operation; it worked perpendicularly as this model (No. 1) stands. It received a ball and turned it out a bloom; I stood there and saw 3 or 4 heats put through it, about 15 balls. They made about 5 balls to a heat at that time; it did the work pretty tolerably well, that time. I went up after that, sometimes once a week, sometimes once a month, to see it work. To the best of my knowledge Mr. Burden had it running there two years before he took it down.

(A model of the squeezer used by the defendants was here shown to the witness.) This model is marked No. 2; it resembles Mr. Winslow's squeezer; I have seen the machine which Mr. Winslow has in operation; I saw it in operation at Mr. Winslow's works, called the Albany rolling mill, I believe, and carried on by the defendants. The first time I saw it there, was in the fall of 1848, about a year and a half ago; I saw it running; it was reducing a puddler's ball into a bloom; I have seen it frequently since, sometimes once a month, sometimes twice a week; I have been at Mr. Winslow's works when he had five puddling furnaces in operation, and also when he had seven. Five balls to each heat is the usual work, and six heats in twelve hours, making thirty balls in twelve hours, or sixty balls in twenty-four hours, per each furnace. Sixty balls will make 2 tons, 4 cwt. of blooms, generally. In six furnaces there would thus be 13 tons, 4 cwt. of blooms made in twenty-four hours, six furnaces making 360 balls in twenty-four hours. Winslow's machine would reduce that number of balls in twenty-four hours. I never saw any mode like Burden's of converting puddler's balls into blooms, before I saw his machine. The old modes I have seen are the hammer, the rolls, and the alligator squeezer. This model represents the forge hammer; this is the alligator squeezer, and this is what we call puddle-ball rolls. Nobbling rolls are a substitute for these. The first two grooves in puddle-ball rolls have large upsets. I never saw but one pair of puddle-ball rolls in England, and but one in this country. The hammer was considered the best of the old modes of converting puddlers' balls into blooms; turning a puddler's ball into a bloom, requires the cinder or dross, the impurities in the iron, to be got out of it. To make a good bloom out of a ball, the loss ought to be nine or ten pounds out of a ball of a hundred pounds weight. A ball of one hundred pounds weight ought to make a bloom weighing 90 or 91 pounds. The bloom, immediately after it is made, is rolled by rolls into a billet or square bar; that is then cut into proper lengths to be reduced to other sizes of iron. The billets are not called

bars till they have gone through a second process. The billets are cut and heated to be rolled smaller. If the cinder was not got out by the rolling into a bloom, the impurities would come out in the next process. The puddle ball rolls made the worst bloom among the three old modes; of the old modes the hammer would do the work the quickest. The ball was put under the hammer; a man then put a rod of iron, called a staff, into the ball, which stuck into it, so that he could sling it and turn it; it was carried to the hammer by tongs; there were generally two men to attend to the hammer. I think they will make a bloom in a minute and a half, or shingle a heat of four balls in six minutes, doing the work well and making good blooms. I have repeatedly shingled a heat in six minutes by the hammer. If Burden's machine runs at fair running, with puddlers, bringing balls as fast and as safely as it can run, it would roll out. I think, four balls in a minute; I think Burden's machine makes from 20 to 22 revolutions in a minute; it goes around twice to make a ball. In speaking of Burden's machine, I do not refer to the vertical machine like this model, but to a horizontal machine which plaintiff is now working. When the vertical machine was laid horizontally, it had the same cylinder or barrel, but a new shell was cast, which goes around the cylinder more than the shell did in the vertical machine. One revolution of the cylinder in the vertical machine, like model No. 1, makes a bloom; in the vertical machine the bloom came out at the lower part, and fell down on a plate; it did not want anybody to help it out; the bloom does not come out of Mr. Winslow's machine without being taken out; it does not discharge itself; puddlers generally work by the ton; a puddler can slight his work; Burden's machine generally tears to pieces a badly puddled ball, one badly worked and not brought to perfection. This effect would not be as common under the hammer. Under the hammer, the shingler can favor a bad ball, and, if he has a spite against a puddler, can break his balls. Under the hammer, a good ball cannot very well be spoiled by accident; when a ball is well puddled, Burden's machine will treat it very handsomely. In Burden's machine the cinder squeezes out at each side, and at the bottom. At the top a great portion of it sticks to the cylinder and chills immediately; the operation of the machine then throws it off. It only sticks temporarily. Some little portions of it will stick.

On being cross examined the said James Warr testified as follows:

Mr. Winslow's machine has a tendency to stick together a badly puddled ball. I do not think Winslow's machine will make a better bloom out of a well puddled ball than Burden's will. The object of compressing the ball is, first, to reduce it, but mostly to get out the impurities. In Burden's machine the stationary shell tends to tear the ball; it is torn as the barrel goes around. In Burden's machine the ball is acted on upon two sides, and being pressed upon opposite sides by one moving and one stationary surface, it will be torn, if it has not adhesive quality enough. When the hammer acts on the ball it tends to compress, and not to tear. I think the hammer does not tend to

express the impurities quite as well as Burden's machine does. Pressure is what expells the impurities best. I think the principle of compression in Burden's machine and in Winslow's is the same. Burden's has more tendency to tear the ball, because his shell is stationary, while in Winslow's all the surfaces move. Two machines can have a different mechanical action, and yet be on the same principle. I think the surfaces in Winslow's machine, working in unison, produces a different mechanical action on the ball from what is produced in Burden's machine, where his shell is stationary. By working in unison, I mean revolving in opposite directions, that will give a different mechanical action. If one surface revolves 24 times a minute, and the other 12 times, the ball will not be torn, because the surfaces work in unison. In Burden's machine the ball is held by the shell while the cylinder turns it. In Winslow's the ball is pressed on three sides; in Burden's it is pressed only on two sides. It is not the pressure on three sides in Winslow's machine that prevents the ball from breaking when it is badly puddled, but it is its position between the revolving rolls with the hammer at its end. In Burden's first vertical machine, of which I have spoken, the shell extended about half around the cylinder. I think I am positive it would discharge a ball at one revolution. Burden's second machine, the horizontal one, had the shell coming further around. That was the only difference between the two, I believe. The vertical and horizontal machines, of which I have spoken, had, both of them, a flange on each side of the shell. The machine now in use is horizontal, and has no flanges on the shell. It has a flange on the lower edge of the cylinder, and the other flange is neither on the shell nor on the cylinder, but slides up and down on the shaft of the cylinder, and is free to rise. I cannot tell why these changes have been made; I never inquired. This model, marked 1, C. L. W., is a model of the horizontal machine of Burden's now in use. When the balls are put into the machine they are in a high white heat. If the running of the balls through the machine was continued a length of time it would heat the machine; there is, therefore, a limit to the working of the machine. I have seen the balls from seven puddling furnaces and two scrap furnaces, all in operation at the same time, put through Burden's machine, about 32 balls in 15 minutes. Sometimes the machine has five or ten minutes, or a quarter, or a half of an hour to rest. The average rate of supply would not, in ordinary cases, be two balls per minute. I do not believe that the machine would stand two balls per minute all day. It is not expected in any case whatever. There are never furnaces enough to supply balls at that rate for a whole day, and the men could not stand it to work the machine at that rate. In Burden's machine the cinder will not unite with the hot iron. A little may be forced in which will not come out at the same place that it is forced in. It would be no advantage to prevent forcing the cold cinder against the surface of the iron. Hot cinder will find its way through the cold cinder any time, even if all the fires were shut up. The cylinder of the

horizontal machine, like the model 1, C. L. W., goes around nearly twice to make a ball.

On being again examined by the counsel for the plaintiff, the said James Warr testified as follows:

In the horizontal machine, the moveable upset weighs 1200 or 1300 lbs. The lower end of the bloom is upset by the flange on the cylinder. The horizontal machine, with the moveable upset, is the form always used now.

The counsel for the plaintiff then called as a witness William Gibson, who being sworn, testified as follows:

I work at the Troy Iron Works; I am employed by the plaintiff; I am general superintendent of the works; I have been engaged in the working of iron since 1831; I went to work first for Mr. Burden 19 years ago the first of June; I was at work for him in 1837 and 1838; I saw the first experiment made by Mr. Burden at rolling a puddler's ball into a bloom; it was in the fall of 1838, in September; I so far helped in the experiment as to be present; Mr. Burden superintended and directed in the experiment; he desired me to get 2 pieces of casting from 4 to 6 feet long, and 12 inches wide, and an inch and a half thick; they were plates used for binding the furnaces; they were on hand; after I got them he desired me to take them to the blacksmith's shop; I did so; the plates were then placed the one above the other, and he sent for 20 fifty-six pound weights and put them on the top plate; we did not know what he was going to do; he then took a piece of iron; a round ball, not very large, as large as an orange, and put it on the bottom plate, and the blacksmith dragged the top plate over it and it came out a roll; Mr. Burden took the roll away; it came out elongated a little; he did not tell me what he was doing this for; he told us to say nothing about it; we did not know what it meant; that afternoon, or the next day, the mill-right commenced and made this wooden thing, a cam on a shaft; he made this piece and a shell to fit it; the experiment with this was one or two days afterwards; this wooden piece was the pattern; the casting with which the experiment was tried was made from it; the cam and shell were cast in one or two days, and put together immediately; Mr. Burden and the mill-wright made the pattern, got the casting made from it, and tried to make a bloom; it was attached to one of the trains of rolls to get power; Mr. Burden tried it, but could not get the ball in because the cylinder came too close to the shell; he then reduced the surface of the cam a little, and cut a V-shaped piece out of the casting, and without altering the shell, rolled a piece of iron through, and made a small bloom of it; after he altered the cam it was like Mr. Winslow's cam; he took the bloom away; I believe Mr. Winslow was boarding with Mr. Burden at that time; the machine with which this last experiment was made stood in the mill for some time, say six months, after the experiment was made, attached to the rolls; Mr. Burden and Mr. Winslow were frequently together; they boarded together, and would come down to the mill together; at this time Burden was not carrying on any puddling; he was building

the rolling mill he now has; Burden got a part of his mill at work in July, August, or September, 1839, 3 trains of rolls; he started his puddling furnaces that fall, probably in November; Mr. Winslow was puddling before that; some short time after that one of the pattern makers commenced making patterns for a working machine like this model, (No. 1;) this was in the spring of 1839; I saw the pattern maker at work at them in the spring or summer of 1839, and saw Mr. Burden working with him; the patterns were commenced in April or May, and the machine was not started till in the fall; they were 3 or 4 months in making the patterns; I saw a rough sketch from which the pattern maker was working; there were a good many alterations in the work as it was going on; the machine when cast was put up in the Troy iron works in the rolling mill; it was tried shortly after it was put up; there was one puddling furnace started; most of our hands were put out of the mill; only a few were left in; there were, I think, 4 or 5 balls put through the machine at the first experiment I have mentioned; there was one heat; the balls came out blooms; the machine was then taken apart and a new mouth piece made; the first mouth piece was rather flat, and had straight sides; the effect of the change was to contract it and make it like the model, a half circle; the first machine ran about two years; I was acquainted with the aligator squeezers; Mr. Winslow had them in his mill; Burden's machine, during the 2 years, made good blooms; I have seen balls hammered into blooms; it takes about 1½ or 2 minutes to hammer a ball of 100 lbs. weight into a bloom 4 inches square; Burdens machine, running safely, and having balls brought to it as fast as it will work, would make from 5 to 8 blooms in a minute, that is, if the blooms were not to be rolled immediately afterwards; we do not need to apply any mode of cooling by water in our machine; the first 2 or 3 years we did put water on the machine; I suppose it was put on to keep the machine cold; Mr. Burden never explained the object; then the practice was abandoned, and we have not done it since; I have frequently seen 2 balls between the cylinder and shell at once when the machine was going, and once I saw three, but that is contrary to the rules of the mill; it made blooms when more than one ball was in; the more quickly the bloom is produced the hotter it is, and the more easily rolled; the practise is, as soon as the squeezer discharges the bloom, to put it through the rolls; it is taken from the furnace with tongs, generally by one man; I have seen a machine at work at Mr. Winslow's mills for converting puddlers' balls into blooms; this model (No. 2) is a fair model of it; I first saw it there about two years ago, probably more; I have seen it work since then; he uses the same machine now in his mill.

On being cross examined the said William Gibson testified as follows:

The ball Mr. Burden rolled in the small cam machine was not a puddled ball, it was the size of a large orange; it was a piece of bar iron heated up; I know why Mr. Burden did not make his large machine on that plan; the difficulty was, he had to stop the machine to

put the ball in; I cannot say whether Burden received any suggestions from Winslow; I knew of Mr. Burden's trying an experiment to roll out puddle balls between three rollers. I have seen small pieces rolled out; he made the experiment two years ago; he had his horizontal machine in operation at the time; the machine with 3 rollers is not completed; I cannot say what it will do; it is not in successful operation at present; I have seen blooms taken from the hammer too cold to be rolled, and heated over again in order to be rolled; as a general practice the hammer reduces the bloom quickly enough to roll it out; I have seen blooms re-heated only occasionally; the hammer is kept working on one ball till the next ball comes; I have seen the hammer at work in Pittsburg; I am not a shingler, and speak from observation; Mr. Winslow's machine cannot work more than one ball at a time; I have never seen Mr. Burden use the cam except in the miniature experiment of which I have spoken; when Mr. Burden worked his vertical machine he had 5 puddling furnaces and 1 scrap furnace in operation.

On being again examined by the counsel for the plaintiff, the said William Gibson testified as follows:

The experiment with 3 rollers was to reduce the puddler's ball into a bar directly from the puddling furnace. It was to do away the necessity of rolling, and effect 2 operations in one. It had 3 converging rollers.

The counsel for the plaintiff then called as a witness William D. Onthank, who, being duly sworn, testified as follows:

I live at Troy; I am in the business of rolling iron; I have been a workman in the business for 13 years; I was at work for Mr. Burden in 1837, 1838, and 1839; I am at work now for the plaintiff. I saw the small machine, part of which was cast from this wooden pattern, a cam on a shaft, the same machine spoken of by the witness, William Gibson. I was there when it was first put up; it was some time in the year 1838; I witnessed the first experiment that was tried with it. It was put up in the old mill, at the end of part of a train of rolls, of which I had charge. I had to take up my slitting machine to accommodate it; I did so at the request of Mr. Henry Burden. We put up the little machine 2 or 3 different times. The 2d or 3d time it was put up Burden came into the mill with some gentlemen, and asked me to throw it into gear. I was rolling plate at the time. I did so; it did not do any work then; it only went around. One of the gentlemen was Mr. Winslow, one of the defendants. The machine run but a a few moments. The gentlemen then turned and went out. I heard nothing said by Mr. Burden then, for I was at work.

On being cross examined, the said William D. Onthank testified as follows:

Mr. Winslow was not the only person present. I do not know how he came there, except that he happened to be there. I knew him, but not the others. The reason the machine was not tried then, was that the furnaces were occupied. After I had started the machine I

went back to my work. I cannot say what time of day or year this was—whether spring, fall, summer, or winter. Nobody made any remark about the machine at the time, or gave any description of it. I never told any body that any remarks were made about the machine at the time. I never heard any remarks made about that machine at any time. to remember what was said. Nothing but the cam turned. I do not know whether any body else but myself saw Mr. Winslow in the mill at the time. I know who were at work in the mill at the time; John Morragh was running a jenny at the time in another part of the mill, a short distance at my right hand, a little farther off from the machine than I was. The gentlemen remained but a very few minutes looking at the machine. I cannot say whether they remained long enough to examine it. I did not hear any conversation at all between them at the time. This was 12 years ago.

On being again examined by the counsel for the plaintiff, the said William D. Onthank testified as follows:

It was very noisy there, and difficult to hear. I did not stop to hear what was said. Other persons came in. I have always remembered that Mr. Winslow was there.

On being again cross examined, the said William D. Onthank testified as follows:

I cannot remember who were working with me at the mill at the time. The hands were changing every day or two.

On being again examined by the counsel for the plaintiff, the said William D. Onthank testified as follows:

We were building the mill then.

The counsel for the plaintiff then called as a witness George Gibson, who, being sworn, testified as follows:

In August, and the fall of 1839, I worked at Mr. Burden's iron works. I was engaged at millwright work and pattern-making. I was engaged in making the patterns of the machine of which this model (No. 1) is a model. We were engaged three or four months in making the patterns for the working machine. The work was done in parts. Improvements, I suppose, were put on under Mr. Burden's direction.

The counsel for the plaintiff then called as a witness Edward S. Renwick, who, being sworn, testified as follows:

I reside at Washington city. I was educated as a machinist in the first place. I have studied, as well as practised, the art of making machinery. I have had my attention directed to scientific subjects connected with mechanics since I was thirteen years of age. My attention was directed to them by my father, Professor Renwick, of Columbia College, in the city of New York. I was employed as subordinate in an iron establishment in 1840; and from January, 1845, till 1849, I was at the head of the establishment with which I was connected. I took charge of it as chief. I left it in April, 1849. It was the Wyoming iron works, at Wilkesbarre, Pennsylvania. It was, at the time I was in it, one of the largest rolling mills in the country, and it

is still one of the first class. It had a nail factory connected with it. It had in operation six double puddling furnaces, equal to twelve single puddling furnaces. We reduced puddlers' balls into blooms, and then rolled those into bars. I have had to plan and put up machinery, and see to its construction. I have turned my attention to civil engineering. Since April, 1849, I have pursued the business of agent for soliciting patents at Washington. I consider the study of the difference and of the identity of machines as a very important branch of my present profession. One point in reducing a puddler's ball to a bloom, is to change its shape, so as to get it into a convenient shape to put it between the rolls by which it is converted into a long bar; another point is to get rid of the cinder or dross; and the third point would be to render the spongy mass more compact. That is a natural consequence of the other two. Wrought iron is manufactured always, when puddling is the process, from pig iron, in a puddling furnace. The pig iron contains quantities of impurities. In addition to those that are in the pig iron, various matters are thrown into the furnace to help and quicken the process. The iron thrown into the puddling furnace is most generally what is called pig iron. In addition, there is the oxidation of the iron under the process; the chemical action induced by the action of the air, which is a waste, in addition to the impurities. The object of stirring up the iron in the puddling furnace is to convert cast iron into wrought iron. There is a substance in the pig iron like charcoal; and as the iron is stirred this passes off, and the mass thickens. As the process proceeds the heat of the furnace is increased. The goodnes of the puddler's ball depends on the thorough stirring of the iron. If the iron is badly puddled, it never rolls as smoothly or makes as good a bar, because it has impurities in it. The better the ball, the better is the resulting iron; the hotter the ball, the better it finishes. If the ball is cold, it strains the machinery in rolling, and takes more power, and does not roll as smoothly. The hotter the ball is got into the rolls the better. The old modes for reducing a ball to a bloom were the forge hammer, the squeezer, or alligator jaws, and the puddle-ball rolls. All three of these modes required somebody to attend to the process; the machine could not do it alone. The hammer was defective in several respects. It required a staff or bar of iron one inch square and five feet long, one end of which, for the length of six inches, was heated to a welding heat, and welded to the ball, and by it the ball was turned. Every ball used up about six inches of the bar; the labor of making that was lost. Besides, the hammer would take two or two and a half minutes to make a bloom; and the bloom must be kept under the hammer till the next ball comes, to prevent the face of the hammer from striking the face of the anvil and breaking. In case another ball was not brought soon enough from the puddling furnace, the bloom would get too cold to be rolled. The risk of breaking the hammer was very great; the hammer, without the face, weighed from three to six tons; the face weighed 1200 pounds; the faces broke very frequently, and required to be renewed. They sometimes became red

hot, and it was necessary to stop the hammering. I consider hammering to have been the best of the three old modes; the next best was the alligator squeezer; that required some one to turn the ball during the process, and did not squeeze out as many impurities, or make as smooth and nice a bloom, as the hammer did; hence, when the iron was taken to the rolls the bar was rougher, and had fag ends, that is, the ends were rough and ragged for a distance of from four to eight inches, and had to be cut off, and went generally into what is called a scrapping furnace; besides, the bar was not so good, because as much cinder was not taken out of it. The squeezer generally required more time than the hammer, though it has been made to do its work as quickly as a hammer. Puddle-ball rolls were a pair of large rolls, about twenty inches in diameter, with large grooves, and rolling toward each other; the ball passed between them, and was then handed back over them, and passed between them again, either through the same groove as before or the next one. When the ball was got to the size of a bloom, it was taken to the rolls for rolling bars and billets. The puddle-ball rolls were also called nobbling rolls. In the action of these rolls the drawing of the iron was unequal; the outer edges of the grooves turned faster than the inner parts. That unequal operation on the iron tore it partially apart; one part of the groove tending to keep back the iron and one to draw it on. The reducing to a bloom by the rolls got out less cinders than either of the other modes, and left the ends more ragged, and was a slower process, and suffered the bloom to get colder. I never noticed that a reheating was necessary with the rolls. It was not necessary, as under the hammer, to keep one ball in the rolls till the next came.

I have seen the model and drawings of Mr. Burden's machine; I have seen one of Mr. Burden's machines, constructed substantially according to his specification, work and turn balls into blooms. The advantages of Burden's machine are that it is self-acting; after the ball is once put in, it requires no farther attention until the bloom comes out; it, therefore, saves the labor of those persons who were employed in the old modes to help do the work. Putting twenty balls under a hammer, and converting them into blooms, would require thirty minutes. Burden's machine performs the work faster; it would, running as it would be safe to run it, put the balls through at the rate of five per minute. I think there would be no difficulty in doing that. I think Burden's machine will express the cinder as well as the hammer would, even when the hammering was well done. Let there be furnaces enough to keep Burden's machine running as it ought to run, and then have hammers enough to do the same amount of work, and I think that, between the two modes, the saving by Burden's machine would be $2 per ton in this country. The Danville iron works have turned out 1,000 tons of iron per month. An establishment making 4,000 tons of iron a year, would save $8,000 a year by the use of Burden's machine.

I consider the essential principle of Burden's machine to be the reducing of a puddler's ball to a bloom without human aid, from the time

the ball is put in till the bloom is finished, by surfaces which get closer to each, or approach each other, and turn and compress the ball between them. The surfaces get closer together, and cause the ball to roll between them without any assistance whatever, and the ball is reduced and the cinders are expressed. I call the space between the surface a wedge-shaped space in Burden's flat and circular machines. I consider those two machines as the equivalents for each other; I consider that it makes no difference in the principle of the machine, whether only one of the surfaces move, or whether both move. If each surface revolved twelve times, or one revolved twenty-four times and the other none, I think that, independent of the rapidity, there would be no difference in the action on the material; I do not think the essential character of the machine would be different. When both surfaces move, they must move in opposite directions, unless one goes faster than the other in the same direction; I consider that, as long as the ball is made to revolve on its axis by the surface, it makes no difference whether the ball is or is not kept in the same place. Mr. Burden speaks, in his specification, of the vibrating of one or the other of the reciprocating surfaces. The conversion of the lower support into a couple of rollers makes no difference as regards the principle. Both Burden's and Winslow's rotating machines could be made out of Burden's machines with plane surfaces. If the plane surfaces were flexible, they could be bent into the rotating machines. To make Winslow's two bearing rollers, I would take two pieces of Burden's lower plane support and bend them into a curved line; I would do all by making curved lines out of straight ones. Winslow's two bearing rollers are a mechanical equivalent for Burden's lower moving plane support. When the ball is first put into Burden's rotating machine, its rough ends are turned in by the revolving of the cylinder, and the ball is smoothed without being materially converted into a cylinder; as the ball is carried around it is elongated and compressed, until it is made into a bloom. When the ball first goes in, it is converted into a sort of spherical form; I have seen this and watched it very carefully. The machine in which I noticed this had side flanges at the mouth piece, and had no lifting up flange. The first effect of Burden's machine is to convert the ball into a sphere something like a cannon ball; if you put into the machine a ball smaller than it can deliver, the bloom will still come out with its ends upset, because the ends are turned in by the first action of the machine. The ends of the bloom come out slightly bulging, but smooth. I have seen this; I consider this to be as good as to have the bloom come out with the end flat; even these round ends require to be cut off, so as to square the bloom. The smallest ball I saw put into the machine of which I have spoken would not weigh more than fifty pounds, and the largest weighed 130 pounds, and both came out with nicely smoothed ends; each bloom was of equal diameter, but one was longer than the other. The flanges extended about five feet around from the mouth; the circumference of the cylinder was thirty feet; the shell extended about seven-eighths of the way around the cylinder.

The only difference that I see in principle between Winslow's and Burden's machines is, that in Burden's the smoothing of the ends of the bloom is effected by the rounded mouth piece, and in Winslow's by a hammer on one end and a flange on the other. As regards the compression and rotation of the ball, and its reduction to a bloom, they are the same; both cause the ball to turn on its axis without assistance. I get Winslow's cam from Burden's straight wedge-shaped compressor, as if it were a piece of India rubber bent around. Both Winslow's and Burden's machines elongate the ball in a line parallel with the axis, on which the rotating surfaces turn. Winslow's two bottom rollers I do not consider as any thing more than a moveable bed piece. Without the action of the cam compressor in Winslow's machine, the ball would merely be turned on its axis, without being at all compressed. There are differences in the mechanical construction of the two machines, but not in their essential principles. In Burden's machine the bed, or cylinder, is on the inside, and the wedge is the compressor; in Winslow's the two lower rolls are the bed.

On being cross examined the said Edward S. Renwick testified as follows:

In speaking of the saving, by the use of Burden's machine, I speak from my knowledge of the manufacture of iron. I have never worked one of Mr. Burden's machines. Before I left the Wyoming iron works the proprietors contracted with Mr. Burden for one of his machines; I urged them to have one. Thatcher T. Payne, of New York, owned those works then. When I left them they were at work. After I left them, I had charge of a blast furnace for more than a year. The pig iron we used in the iron works was made at furnaces in the neighborhood. The curved mouth piece in Burden's machine does not make bad work, as the grooved nobbling rolls do, because, in Burden's machine, the ball only touches at two points; the most protuberant parts touch first; they touch the groove and the cylinder. I saw a machine, like the rotating one described in Burden's specification, at work at Saugerties, Ulster county, New York; it was laid on its side; the shell was carried farther around the cylinder than in the one in the specification; the flanges on the shell were cut off at about five feet distance from the mouth; they were adjustable. There is nothing about that in the specification. A good puddler will never let his balls differ more than fifteen pounds in weight. The machine described in the specification will take through any ball that a puddler makes in his ordinary work; if the delivery opening were two feet long, and four inches across, and would deliver a ball of 100 pounds weight, a ball of 110 pounds would not go into the mouth piece. Mr Burden, in his drawings, gives proportions. He represents the size of a puddler's ball, and by that I could judge of the right size of a machine. I have never measured the sizes in the drawings; I should, without measurement, judge that the proportions were right. In the Saugerties machine the shell was made in separate pieces; there was no necessity for extending the flanges farther around. I have been told that Mr. Burden built that machine.

Leaving off the side flanges from the shell, to the extent found in the Saugerties machine, will not enable the ball to spread out farther than it otherwise would. Mr. Burden may have put flanges on his shell in order to strengthen it. If the ends of the bloom were finished by the flanges, they would be represented in the drawings as perfectly square. I understand that the flanges are intended to upset the ends, but that may be done by the flanges at the mouth piece; I never heard of upsetting being done by any thing but blows and pressure. I can not say whether upsetting can be done better by end blows or pressure, than by side pressure. I think that, in the ordinary work of a mill, Burden's machine will run for hours together at the rate of five balls per minute. I saw a horizontal machine of Burden's in England, and saw it work for an hour as fast as the balls could be fed in. You can keep water running on Mr. Burden's machine without injuring the machine; I do not recollect whether there was water running on the machine I saw in England. I consider the self-acting principle of Burden's machine as an important element of it; I include in that its discharging itself. Winslow's is not self-discharging; it is self-acting till it discharges. I consider all self-acting spinning machines as on the same principle as regards the self-action. Self-acting is doing a thing without assistance from the hand; I consider that as a principle in Burden's machine. I consider the effect as a part of the principle of a machine so far as that is concerned; I consider the self-action to be an essential part of the principle of Mr. Burden's machine.

If Mr. Burden's cylinder should be stationary, and his outer shell should be made to rotate, that would be the same principle of converting a ball into a bloom, that is found in the machine described in his specification. I consider all the various forms of the machine, of which I have spoken, as equivalents for each other; I consider, as mechanical equivalents, all things that will produce the same effect; I consider Winslow's two bearing rollers as the equivalent of Burden's lower plate. If Burden's shell was a series of rollers, gradually approaching the cylinder, the work would be done in the same manner as in the present machine; I think it would compress a ball into a bloom. I do not think that Burden, any where in his specification, speaks of pressing the ball on three sides; Winslow compresses the ball on three sides. I consider that Winslow's and Burden's machines effect the same purpose of reducing a ball into a bloom. If Burden's shell moved around his cylinder, instead of his cylinder in his shell, a mode could be invented of feeding in the ball. I do not recollect that any mode is shown in Burden's patent. In Burden's reciprocating tables you might have a hammer the whole length of them to upset the end of the bloom.

The counsel for the plaintiff then called as a witness Peter Cooper, who, being sworn, testified as follows:

I reside in New York. I am engaged in the manufacture of iron in the State of New Jersey; my rolling mill is at Trenton; my blast furnace is at Phillipsburg; I roll bars at Trenton; I have rolled the T

rail; I have had upwards of 600 hands employed in my rolling mill at one time; there are from 50 to 100 hands employed in my blast furnace; I have run out of my blast furnace 212 tons a week; in my rolling mill I have rolled 1000 tons of finished railroad rails in three weeks. I have twenty-four double puddling furnaces, equal to forty-eight single ones, when in full blast. I have curtailed my business now. I have been engaged in the manufacture of iron about fifteen, sixteen, or eighteen years. I built the Canton iron works at Baltimore, which I have recently sold. I used in my rolling mill, first the hammer, and then Burden's squeezer; I had but one hammer; I introduced Burden's machine six or seven years ago, on building the factory at Trenton; I have three of Mr. Burden's machines; I introduced them one at a time; my mill was so large that I found it convenient to have more than one squeezer, in order to bring the blooms, when finished, near to the various rolls; the main building of my mill is 350 feet long, and from 175 to 200 feet wide; I have never used any thing but Burden's machines at the Trenton works; they have performed the work generally well, equal to my highest expectations; we have occasionally broken the machines, and repaired them; the machine weighs from 10 to 15 tons; we have never experienced any difficulty in getting the cinder out of the machines; it either comes out in the liquid form, or shells off and drops out; in my machines, we can wedge up the outer shells and bring them nearer the cylinders, so as to alter the sizes of the blooms; my machines are horizontal, and have the moveable flange. I have seen the machine at Saugerties; I saw it start; Mr. Burden pressed me to go and see it; I saw it within the last two months; I saw it work; it had no moveable flange; I heard Mr. Renwick's description of it; that was correct; the flanges only extended five or six feet from the mouth-piece; I saw it make blooms; it did the work remarkably well; better, I think, than I had ever seen it done before; the balls that went in were of different sizes; I should suppose they varied in weight from one-quarter to one-third, and perhaps nearer one-half; I did not notice, in the bars rolled from them, any material difference between the ends of the large and those of the small blooms; the ends were very smooth; I prefer the Saugerties machine to those with a moveable upset, which I have. I never saw machines do as good work as the Saugerties machine did; I never saw one work like the Saugerties machine; I had never seen one where the shell was brought so far around. When the ball was first put in, the protuberances are rolled in, and the ball gets into the shape of a sphere, and after that the compression on the sides seems to be sufficient; the five feet of flange seems to be sufficient to upset the ends, and when the bloom comes out, the ends are smooth; I do not think an extension of the flange beyond five feet is of any advantage. I think the iron that came from my hammer was not as good as that I get from Burden's machines. The hammer I used was the best I have seen.

On being cross examined, the said Peter Cooper testified as follows:

The first I saw of the Saugerties machine was two months ago; I believe it was started for the first time then; the cylinder was about ten feet in diameter. The diameter of the largest of my machines is not over four or four and a half feet. I have never seen Winslow's machine in operation, nor any of the blooms made by it. The hammer I had was raised two and a half feet, and fell perpendicularly; it was not the usual trip-hammer.

The counsel for the plaintiff then called as a witness Lawrence Hill, who, being sworn, testified as follows:

I have resided in the neighborhood of Glasgow, in Scotland; I intend to reside in the neighborhood of New York; it is about a month since I arrived in this country; I have been over twice before; I call myself a mechanical engineer; I have been conversant with the manufacture of iron for the last ten years; I got my knowledge chiefly in Scotland; I have been extensively among the iron works of England and Scotland; I have been myself engaged practically in making iron for two years, about twelve miles from Glasgow; I was the managing director of the works; it is nine months since I left them; they are the second or third in extent in Scotland. I am acquainted with Burden's invention for reducing puddler's balls to blooms; the iron works in England and Scotland always used for this purpose the hammer, and sometimes they had in addition the alligator squeezer. I first became acquainted with Mr. Burden's machine nine or ten years ago; I have introduced his machine into England and Scotland; into Scotland first, in 1841 or 1842, at Mr. Band's works at Gatscherry. I have introduced into Scotland and England seven or eight of Mr. Burden's machines. The last one was put up in my own works in Scotland. I put up one in England. The machines, with the exception of the last one, were all horizontal. The first one I put up had the shell going two-thirds of the way around the cylinder; one flange was cast on the cylinder, and the other flange was a moveable upset. I saw one of Burden's vertical machines at Mr. Thorneycroft's works at Wolverhampton, in Staffordshire, in England; they are large works. The ball entered the machine at about eighteen inches from the ground, and was delivered at the same distance from the ground, the machine being sunk in the ground; it had no moveable upset; the flanges only came half way around the length of the shell; the shell went half way around the cylinder; the flanges were rigid; the flanges extended to the bottom of the machine, or through one-fourth of the circumference of the cylinder. I have seen the Saugerties machine. Thorneycroft's machine was more like the one at Saugerties as regards the flanges. I saw Thorneycroft's machine work several times; it worked very well, and turned out blooms very well. Thorneycroft is an experienced man, and would not have worked the machine if it had not turned out work well. I have seen the machine put up abroad, both vertically and horizontally. All the machines I put in abroad I saw work, except one; for that one I furnished drawings. I took over with me from this country sketches which I had made of the

machine of Burden's which was at work in his shop. I had not then seen his specification. I do not know whether the machine was patented then, or not.

I was present and saw the Saugerties machine work when Mr. Cooper did. I agree with Mr. Cooper as to the work of that machine. I have seen machines in England and Scotland work as well as the Saugerties machine did. Thorneycroft's worked as well.

On being cross examined the said Lawrence Hill testified as follows: The whole number of iron works in Scotland is 8. Five of them use Burden's machine. In Scotland the iron business is small compared with that in England and Wales. I have no interest in Mr. Burden's English patent; the patent for Scotland belongs to me. I never saw Mr. Winslow's machine in operation. I became acquainted with Mr. Burden in this country.

The counsel for the plaintiff then read in evidence the deposition of John Griffin, in the words and figures following, to wit:

In the circuit court of the United States, for the northern district of New York.

PETER A. BURDEN
vs.
ERASTUS CORNING AND JOHN F. WINSLOW.

John Griffin, sworn:

Question 1. Where do you reside; what is your profession and occupation?

Answer. I reside at Safe Harbor, Lancaster county, Pa., and am manager of the Safe Harbor iron works at said place.

Question 2. Are you acquainted with the process of reducing puddlers' balls, or other similar masses of iron, into blooms?

Answer. I am well acquainted with the process.

Question 3. Are you, or are you not, acquainted with the machine patented to Henry Burden, the tenth day of December, A. D. eighteen hundred and forty, styled "a machine for rolling puddlers' ball or other similar masses of iron in the manufacture of iron?"

Answer. I am well acquainted with the machinery patented to Henry Burden.

Question 4. Have you, or have you not, ever known, read, or heard of the process which the ball undergoes in this machinery, prior to its use by Mr. Burden; or of any contrivance for carrying this process into effect, the same in principle as the said machinery?

Answer. I have never read, heard, or known of any machinery prior to the one invented by Mr. Burden, which was similar in principle to his.

Question 5. Examine the drawing and specification marked No. 1, herewith shown to you, and state what they purport to represent. Say, also, whether they are or are not sufficiently explicit to enable a mechanic skilled in the art of manufacturing iron to construct the machinery represented and described thereby?

Answer. They purport to represent a drawing of a machine accompanying a specification for a patent of a machine for reducing puddled balls, or other similar masses of iron, to a bloom, for the purpose of putting it in a shape that it may be rolled into a bar, plate, or other form, and are sufficiently explicit to enable a mechanic acquainted with the art of iron making to construct a machine similar to the one therein described.

Question 6. Have you or have you not ever seen a model of the machinery described and represented in the drawings and specification referred to in the preceding interrogatory?

Answer. I have seen the machine itself in operation, but not a model.

Question 7. Do you know what methods were used to reduce puddlers' balls into blooms prior to the introduction of Mr. Burden's machinery? If so, describe them.

Answer. Prior to the introduction of Mr. Burden's machine, I believe the only methods known of reducing puddlers' balls, or other similar masses of iron, into blooms, were the common alligator squeezers and the tilt-hammer. Shingling is done by the tilt-hammer, which is a heavy mass of iron raised by machinery and allowed to fall upon the puddled ball, or other similar mass of iron, by the repeated blows of which it is reduced to a bloom of, say, five inches square by about twenty inches long, more or less, depending on the mass of iron and the use to be made of it. The ball is turned over and worked up as the blows are repeated, until it is reduced to the requisite form.

The alligator squeezer is a machine with one stationary plate below and a moving plate above, forming an opening of a wedge shape; the upper plate is moved up and down by machinery, it being attached to a fulcrum or pin at the smaller end of the wedge; the ball is introduced by the workman in the wide part of the wedge shaped opening, and as each successive pressure reduces the size of the ball the squeezeman gradually works the ball in the smaller part of the wedge shaped opening, until it is reduced to the proper size and required form to allow of its introduction between the rollers. The first of these two methods above described is by far the best. It much more completely removes or expresses the cinders; still, the length of time required to hammer the ball into a bloom is so great as to make a much less perfect bar, owing to the loss of heat while being hammered; and it frequently happens that, before the bloom can be rolled, it requires to be re-heated, involving a great additional expense without corresponding benefit.

Question 8. Does or does not Mr. Burden's machine effect a saving over the most economical method previously known? If it does, state what that saving will amount to on each ton of iron manufactured.

Answer. Mr. Burden's machine does effect a considerable saving over the most economical method previously known. First, it is self-acting, requiring no hammerman or squeezeman to work the bloom. Second, the space occupied by it is small compared with the amount of work it can do. Third, from the perfection of the bars rolled from the

blooms made by it, owing to the short time the bloom is being prepared by it, and its consequent high heat when ready for the rollers. Fourth, any ball, not properly puddled, introduced into Burden's machine, will not make a bloom, having to be taken back by the puddler and reballed; consequently, no iron can be made from it unless it is well worked in the puddling furnace, thereby compelling the puddlers to do their work well. It has, in consequence, received the soubriquet of the "puddler's boss," by which it is almost universally known by the workmen, and really is a more thorough "boss," so far as good work by the puddler is concerned, than any man can be. One of Mr. Burden's machines can do as much work as can be done by at least three hammers or alligator squeezers. Its liability to breakage is also less than either the hammer or alligator squeezer. In arriving at the saving, so many things have to be taken into the account, that it is very difficult to tell what the saving in all cases would be. In the rolling mill for which I am manager, where forty tons of iron is now puddled in twenty-four hours, the saving would be, I should say, not less than one dollar per ton, probably much more than that.

Question 9. Look at the drawing and description marked No. 2, herewith shown to you, and state what they purport to represent and describe; and if you say they represent and describe a machine for rolling or reducing puddler's balls into blooms, state what, in your opinion, are the points, if any, in which it coincides in principle and mode of operation with, or differs from, the machinery described in the specification and drawing marked No. 1, herewith shown to you.

Answer. The drawing No. 2, herewith shown, purports to represent a machine for reducing puddlers' balls, or other similar masses of iron, into blooms by squeezing or pressing, as recently adopted by Erastus Corning and John F. Winslow, at the Albany iron works. In form it differs from No. 1, herewith shown, but the principle on which it operates is the same. The addition to No. 2, or rather the alteration from No. 1, is a hammer which strikes the ball on the end in place of the flange, as shown in No. 1. My opinion is that the hammer shown in No. 2 is no advantage.

JOHN GRIFFIN.

The counsel for the plaintiff then read in evidence the deposition of John McManus, James McCarty, Evan T. Ellicott, John Barker, Andrew Ellicot, and H. William Ellicot, in the words and figures following, to wit:

In the circuit court of the United States, for the northern district of New York.

PETER A. BURDEN
vs.
ERASTUS CORNING and John F. Winslow.

Depositions of witnesses produced and first sworn, and then examined on behalf of the plaintiff in the above stated action, before David

F. Gordon, president judge of the twenty-third judicial district of Pennsylvania, and of the court of common pleas of Berks county, Pennsylvania, on the 12th day of October, 1849, on the following interrogatories:

John McManus, being sworn and examined, answereth and deposeth as follows:

Question 1. Where do you reside; what is your profession and occupation?

Answer. I reside in the city of Reading, in the State of Pennsylvania; I am engaged in the manufacture of iron and nails.

Question 2. Are you acquainted with the process of reducing puddlers' balls or other similar masses of iron into blooms?

Answer. I am.

Question 3. Are you or are you not acquainted with the machinery patented to Henry Burden the 10th day of December, A. D. 1840, styled a machine for rolling puddlers' balls, or other similar masses of iron, in the manufacture of iron?

Answer. I am. I have one of his machines in operation in the works I am part owner of, in Reading, Pennsylvania.

Question 4. Have you or have you not ever known, read, or heard of the process which the ball undergoes in this machinery, prior to its use by Mr. Burden; or of any contrivance for carrying this process into effect, the same in principle as the said machinery?

Answer. I have not seen any machine to perform this process in preparing the balls for the rolls in the manner Mr. Burden's machine prepares them, nor can I say that I ever knew, read, or heard of any such machine prior to its use by Mr. Burden, or of any contrivance for carrying this process into effect, the same in principle as this machinery.

Question 5. Examine the drawing and specification marked No. 1, herewith shown to you, and state what they purport to represent. Say also whether they are or are not sufficiently explicit to enable a mechanic skilled in the art of manufacturing iron to construct the machinery represented and described thereby.

Answer. They purport to represent a plan or drawing of Mr. Henry Burden's rotary squeezer. A machine can be constructed from the specifications and drawing as therein described.

Question 6. Have you or have you not ever seen a model of the machinery described and represented in the drawing and specifications referred to in the preceding interrogatory?

Answer. I have not.

Question 7. Do you know what methods were used to reduce puddlers' balls into blooms prior to the introduction of Mr. Burden's machinery? If so, describe them.

Answer. I am acquainted with two modes used in reducing puddlers' balls into blooms—by shingling with the hammer, and by squeezing with the squeezer, called the alligator squeezers. I am

not acquainted with any other modes in use before the introduction of Mr. Burden's machinery.

Question 8. Does or does not Mr. Burden's machine effect a saving over the most economical method previously known? If it does, state what that saving will amount to on each ton of iron manufactured.

Answer. It does effect a saving, and makes the iron in better order for the rolls than if squeezed under the alligator squeezers. The saving effected is over the most economical method previously known to me. I cannot say the exact amount of saving.

Question 9. Look at the drawing and description marked No. 2, herewith shown to you, and state what they purport to represent and describe; and if you say that they represent and describe a machine for rolling or reducing puddlers' balls into blooms, state what, in your opinion, are the points, if any, in which it coincides in principle and mode of operation with, or differs from, the machinery described in the specification and drawing marked No. 1, herewith shown to you.

Answer. This drawing and description purports to represent a machine for reducing puddlers' balls into blooms; I am not prepared to answer the residue of this question.

JOHN McMANUS.

Sworn, examined, and subscribed the 12th day of October, A. D. 1849, before me, president judge of the 23d judicial district of Pennsylvania, and of the court of common pleas of Berks county.

DAVID F. GORDON.

James McCarty being first sworn, and then examined on each of the questions or interrogatories herein before fully and at length written and set forth, in the deposition of John McManus, on the paper hereunto annexed, each of the said questions or interrogatories being put to him in the order in which they are set forth in the said deposition, from No. 1 to No. 9 inclusive, answereth and deposeth as follows:

To interrogatory No. 1, as the same is set forth in the written deposition of John McManus hereunto annexed, the said witness answers and says:

I reside in the city of Reading, in the State of Pennsylvania; I am manager of the Reading iron, nail, and file works.

To interrogatory No. 2, as set forth in the same deposition, the witness answers and says:

I am well acquainted with the process of reducing puddlers' balls, or other similar masses of iron, into blooms.

To question No. 3, as set forth in said deposition:

Answer. I am acquainted with the machinery mentioned in this question, having caused one to be made for the Reading iron and nail works.

To question No. 4, as set forth in said deposition:

Answer. I have never known, read, or heard of the process which the ball undergoes in this machinery prior to its use by Mr. Burden,

nor of any contrivance for carrying this process into effect, the same in principle as the said machinery.

To question No. 5, as set forth in said deposition:

Answer. The drawing and specification marked No. 1, now shown to me, represents Burden's rotary squeezer; I have no doubt that a machine could be constructed from the drawings and specification marked No. 1.

To question No. 6, as set forth in said deposition:

Answer. I have never seen a model of the machinery described and represented in the drawings and specification referred to in the preceding interrogatory.

To interrogatory No. 7, as set forth in said deposition:

Answer. I am acquainted with three methods in use to reduce puddlers' balls into blooms prior to the introduction of Mr. Burden's machinery, which I believe to have been the only ones then in use, shingling, rolling, and squeezing, none of which were the same in principle as Mr. Burden's machinery.

To question No. 8, as set forth in said deposition:

Answer. Mr. Burden's machine does effect a saving over the most economical method previously known; the amount per ton I am not able to state; it affords a check upon the puddlers, and prevents them from bringing their iron out before it is well worked, which is a great consideration.

To question No. 9, as set forth in said deposition:

Answer. The drawing and description marked No. 2, as now shown to me, purports to represent a modification of Mr. Burden's machine, called the Winslow machine; the difference between Mr. Burden's and the Winslow machine consists in using a hammer for upsetting in Winslow's, and two rolls underneath the machine, as shown in the drawing; the scroll on Mr. Burden is attached to the frame, and the ball is upset by a moveable flange on the shaft; the scroll on Winslow's is on the centre piece.

JAMES McCARTY.

Sworn, examined, and subscribed the 12th day of October, A. D. 1849, before me, the president judge of the 23d judicial district of Pennsylvania, and of the court of common pleas of Berks county, Pa.

DAVID F. GORDON,
President judge.

Evan T. Ellicott, sworn:

Question 1. Where do you reside; what is your profession and occupation?

Answer. I reside in the city of Baltimore, State of Maryland, and have been engaged in the manufacture of iron more than thirty years, and am practically acquainted with it in all its branches.

Question 2. Are you acquainted with the process of reducing puddlers' balls or other similar masses of iron into blooms?

Answer. I am.

Question 3. Are you, or are you not acquainted with the machinery patented to Henry Burden the tenth day of December, A. D. eighteen hundred and forty, styled a machine for rolling puddlers' balls or other similar masses of iron in the manufacture of iron?

Answer. I am familiar with Mr. Burden's machine, and have seen it in successful operation at the Locust Point works.

Question 4. Have you, or have you not ever known, read, or heard of the process which the ball undergoes in this machinery prior to its use by Mr. Burden; or of any contrivance for carrying this process into effect, the same in principle as the said machinery?

Answer I have never read or heard of the process previous to the invention of Mr. Burden, nor have I ever known, read, or heard of any contrivance for the like object which was the same in principle as the machine of Mr. Burden.

Question 5. Examine the drawing and specification marked No. 1, herewith shown to you, and state what they purport to represent. Say, also, whether they are or are not sufficiently explicit to enable a mechanic skilled in the art of manufacturing iron to construct the machinery represented and described thereby.

Answer. I have carefully examined the drawing marked No. 1, herewith exhibited to me; it is an accurate representation of Mr. Burden's machine, and I believe to be adequate to enable any mechanic skilled in the art and acquainted with the manufacture of iron to construct the machine represented and described.

Question 6. Have you, or have you not, ever seen a model of the machinery described and represented in the drawing and specification referred to in the preceding interrogatory?

Answer. Mr. Burden has shown me a model of his machine described as No. 1, and I have carefully examined it.

Question 7. Do you know what methods were used to reduce puddlers' balls into blooms prior to the introduction of Mr. Burden's machinery? If so describe them.

Answer. I am acquainted with three methods of reducing puddlers' balls to blooms and bars prior to Mr. Burden's invention. First, by rolls, the second by hammering, and the third by squeezing.

Question 8. Does or does not Mr. Burden's machine effect a saving over the most economical method previously known? If it does, state what that saving will amount to on each ton of iron manufactured.

Answer. I am of opinion that Mr. Burden's machine effects an important saving in the manufacture of iron, compared with either of the processes alluded to in the previous answer. The saving consists in dispensing with the hammer-iron; in fuel, and wear and tear of machinery; in the time occupied in the operation, and the consequent saving of metal by the shorter detention in the furnace, and also in a saving of power. The computation of the amount of the saving resulting from the several items I cannot at this moment, state accurately. I consider the invention of Mr. Burden the most important in machinery for the manufacture of iron made during the present century.

Question 9. Look at the drawing and description marked No. 2, herewith shown, and state what they purport to represent and describe; and if you say they purport to represent and describe a machine for reducing puddlers' balls into blooms, state whether, in your opinion, what are the points, if any, in which it coincides in principle and mode of operation with, or differs from, the machinery described in the specifications and drawings marked No. 1.

Answer. I have examined the drawing and description No. 2, as representing the machine recently adopted by Erastus Corning and John F. Winslow at the Albany iron works, as also a model of the same shown me by Mr. Burden. I consider it identical in principle and mode of operation in every material point with that described in drawing and specification marked No. 1.

EVAN T. ELLICOTT.

John Barker, sworn:

Question 1. Where do you reside; what is your profession and occupation?

Answer. I reside in the city of Baltimore; my profession is an iron maker, or iron master and iron founder.

Question 2. Are you acquainted with the process of reducing puddlers' balls, or other similar masses of iron, into blooms?

Answer. I am.

Question 3. Are you or are you not acquainted with the machinery patented to Henry Burden the 10th day of December, A. D. 1840, styled "a machine for rolling puddlers' balls, or other similar masses of iron, in the manufacture of iron?"

Answer. I am.

Question 4. Have you or have you not ever known, read, or heard of the process which the ball undergoes in this machinery prior to its use by Mr. Burden; or of any contrivance for carrying this process into effect, the same in principle as the said machinery?

Answer. I have never known or read of this process previous to the date of Mr. Burden's patent.

Question 5. Examine the drawing and specification marked No. 1, herewith shown to you, and state what they purport to represent; say, also, whether they are or are not sufficiently explicit to enable mechanics skilled in the art of manufacturing iron to construct the machinery represented and described thereby.

Answer. I have examined the model No. 1, and it agrees with the working machine; any intelligent mechanic can make a machine by having the model for his guide.

Question. 6. Have you or have you not ever seen a model of the machinery described and represented in the drawings and specifications referred to in the preceding interrogatory?

Answer. I have.

Question 7. Do you know what methods were used to reduce puddlers' balls into blooms prior to the introduction of Mr. Burden's machinery? If so, describe them.

Answer. I do. Hammering and squeezing *is* both objectionable.

Question 8. Does or does not Mr. Burden's machine effect a saving over the most economical method previously known? If it does, state what that saving will amount to on each ton of iron manufactured.

Answer. It does effect a saving.

Question 9. Look at the drawing and description marked No. 2, herewith shown to you, and state what they purport to represent and describe; and if you say that they represent and describe a machine for reducing puddlers' balls into blooms, state whether in your opinion, what are the points, if any, in which it coincides in principle and mode of operation with, or differs from, the machinery described in the specification marked No. 1.

Answer. I have looked at No. 2 model, and consider that all its variations from No. 1 are decidedly inferior; as there is difficulty and considerable delay in getting in the ball, and also in relieving the machine of the bloom. In other respects they are similar and involve the same principle. JOHN BARKER.

Andrew Ellicott, sworn—

Question 1. Where do you reside; what is your profession and occupation?

Answer. In the city of Baltimore, State of Maryland, and have been engaged in the iron business for the last twenty-three years in all its several branches.

Question 2. Are you acquainted with the process of reducing puddlers' balls, or other similar masses of iron, into blooms?

Answer. I am.

Question 3. Are you or are you not acquainted with the machinery patented to Henry Burden the tenth day of December, A. D. eighteen hundred and forty, styled "a machine for rolling puddlers' balls, or other similar masses of iron, in the manufacturing of iron?"

Answer. I have adopted Mr. Burden's rolling machine, and used it most successfully.

Question 4. Have you or have you not ever known, read, or heard of the process which the ball undergoes in the machinery prior to its use by Mr. Burden; or of any contrivance for carrying this process into effect, the same in principle as the said machinery?

Answer. I have never known, read, or heard of the process previous to the invention of Mr. Burden's, nor of the kind or principle.

Question 5. Examine the drawings and specification marked No. 1, herewith shown to you, and state what they purport to represent. Say also whether they are or are not sufficiently explicit to enable mechanics skilled in the art of manufacturing iron to construct the machinery represented and described thereby.

Answer. I have; and they accurately describe and represent the machine of Mr. Burden sufficiently to enable a mechanic skilled in that branch of business to construct one.

Question 6. Have you or have you not ever seen a model of the machinery described and represented in the drawings and specifications referred to in the preceding interrogatory?

Answer. Mr. Burden has shown me a model of his machine, and I have examined it.

Question 7. Do you know what methods were used to reduce puddlers' balls into blooms, prior to the introduction of Mr. Burden's machinery? If so, describe them.

Answer. Hammering generally; but squeezers sometimes, and thought objectionable, because it presses or works badly refined iron, and is expensive in labor.

Question 8. Does or does not Mr. Burden's machine effect a saving over the most economical method previously known? If it does, state what that saving will amount to on each ton of iron manufactured.

Answer. Mr. Burden's machine does; and not only so, but overcomes the most troublesome part of the business. It saves in repairs, iron, labor, and great expenses of the workmen employed in the process, and in the vicinity of the hammer-iron the liquid cinder, which is sometimes thrown more than 100 feet from the hammer. Burden's machine also, like the hammer, excludes badly refined iron; whereas it has great advantages over the squeezer, which does not act as inspector. The saving per ton depends much on the character of the iron, and varies very much, but is great.

Question 9. Look at the drawing and description marked No. 2, herewith shown to you, and state what they purport to represent and describe; and if you say that they represent and describe a machine for reducing puddlers' balls into blooms, state what, in your opinion, are the points, if any, in which it coincides in principle and mode of operation with, or differs from, the machinery described in the specifications and drawings marked No. 1.

Answer. Drawings No. 1 and No. 2 represent machines for reducing wrought balls of iron to form of blooms, or convenient shapes, and involves only the same principle of mechanics, reducing the balls to blooms by a closer approximation of two lines or surfaces, one or both in motion; and Mr. Burden's arrangements are decidedly preferable.

AND'W ELLICOTT.

H. William Ellicott, sworn—

Question 1. Where do you reside; what is your profession and occupation?

Answer. I reside in the city of Baltimore, and have been engaged in the iron manufacturing business nine years.

Question 2. Are you acquainted with the process of reducing puddlers' balls, or other similar masses of iron, into blooms?

Answer. I am.

Question 3. Are you or are you not acquainted with the machinery patented to Henry Burden the tenth day of December, A. D. eighteen hundred and forty, styled "machine for rolling puddlers' balls, or other similar masses of iron, in the manufacture of iron?"

Answer. I am, and have used it successfully at Locust Point.

Question 4. Have you or have you not ever known, read, or heard

of the process which the ball undergoes in this machinery, prior to its use by Mr. Burden; or of any contrivance for carrying this process into effect, the same in principle as the said machinery?

Answer. I have never read or heard of Mr. Burden's process prior to its adoption by him, nor of any other machine on the same principle.

Question 5. Examine the drawing and specification marked No. 1, herewith shown to you, and state what they purport to represent. Say also whether they are or are not sufficiently explicit to enable a mechanic skilled in the art to construct one.

Answer. I have examined the drawings referred to, and marked No. 1; they represent Mr. Burden's patent balling machine, and are sufficiently explicit to enable a mechanic skilled in the art to construct one.

Question 6. Have you or have you not ever seen a model of the machinery described and represented in the drawing and specification referred to in the preceding interrogatory?

Answer. I have.

Question 7. Do you know what methods were used to reduce puddlers' balls into blooms, prior to the introduction of Mr. Burden's machine? If so, describe them.

Answer. I know of two methods being used prior to Mr. Burden's, viz., hammering and squeezing, by what is generally known as the alligator squeezers.

Question 8. Does or does not Mr. Burden's machine effect a saving over the most economical method previously known? If it does, state what that saving will amount to on each ton of iron manufactured.

Answer. Mr. Burden's machine certainly does effect a very considerable saving, but the exact amount is very difficult to arrive at.

Question 9. Look at the drawing and description marked No. 2, herewith shown to you, and state what they purport to represent and describe; and if you say that they represent and describe a machine for reducing puddlers' balls into blooms, state *whether*, in your opinion, *what* are the points, if any, in which it coincides in principle and mode of operation with, or differs from, the machinery described in the specification and drawings marked No. 1.

Answer. I have examined the drawing and description marked No. 2, said to represent the machinery adopted and used at the Albany iron works, and consider it identical in principle with Mr. Burden's machine, as represented in drawings and model marked No. 1.

H. WILLIAM ELLICOTT.

The counsel for the plaintiff then called as a witness Edward Cooper, who being sworn testified as follows:

I reside in the city of New York; I am the son of the witness, Peter Cooper. I have been acquainted with the iron manufacturing business. Since about 1844, my attention has been directed exclusively to that business. Ever since we have been engaged in the business, I have been engaged in the superintendence of the practical operation of the works at Trenton, and I was the acting manager of the rolling mill,

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for one or two years after it was put up. It is one of the first class of mills in the country; we had at one time twenty double puddling furnaces, equal to forty single ones. My attention has also been directed to the construction of machines; I have designed parts of the machinery for the mill, and have necessarily been called to look into the principles of machines. I am acquainted with the method of reducing puddlers' balls into blooms. We have three of Burden's machines in our mill; they are not all at work now; they are the sole mode we employed in those works to reduce the balls to blooms. They operate to our entire satisfaction. We have had them about five years; ever since we first started the mill; during that period those machines have done a great deal of work. We have, during that period, done as much work as any iron mill in the country, and all of it has been done by these machines. They have given us perfect satisfaction, both as to the quality of the iron they make, and as to economy. We are now working iron for making wire, which requires to be of a very fine quality, and it is all done by these machines. We carry the iron through all its states, from the ore to the wire. I consider the conversion of the ball into a bloom to be a very essential point, as regards the subsequent manufacture of the iron; a defect in making the bloom would be a very great defect. Our kind of work tests the quality of the bloom more severely than any other kind of work it can be put to; for a very small defect in a bloom would, when the iron is drawn into wire, occupy a very considerable portion of its whole substance. Burden's machine is, in my opinion, a saving of expense over any mode formerly used. I cannot state definitely the amount of saving per ton; I think it very difficult to state the exact amount, but I consider it a very decided saving over any of the former modes. Reducing balls into blooms is a considerable item in the iron business. I consider the value of the machine to us to be $1 per ton, taking wages as they are with us. I have seen Burden's machine at work at Danville, in Pennsylvania; at Phœnixville, in Pennsylvania; at Saugerties; at the plaintiff's works at Troy; and at our own mill. I do not recollect any other. I never saw any at Pittsburgh. I have seen them in Scotland and in England; I have seen one at Mr. Foster's works in England. He is one of the largest iron masters in England, and has the reputation of making one of the best of irons; one of the one or two that are the first class of irons in England. I have also seen one at one of Mr. Thorneycroft's works, the same spoken of by the witness Hill. This is one of the largest works in England; I have also seen it at the Chillington iron works, in Staffordshire. I do not recollect any others just now. In Scotland I have seen the machine in use at only one place, the Dundyvan iron works. I have been at all the principal iron works in England, Scotland, and Wales, this last winter; I saw Burden's machines at work, I think, at all the places I have mentioned. I heard no fault found with them by those who used them. When I saw them work, they did the work well. I understand that the machine is patented in England.

I think the description given by my father, by Mr. Hill, and by Mr. Renwick, of the Saugerties machine, was accurate; the flange was removed part of the way around, as described by them. I heard those witnesses describe the working of the machine. I saw it work; the ball is put in at the mouth. The blooms I saw made there, were as good as any I have seen. The balls put in varied in weight as much as puddle balls ever vary; say from 110 pounds weight down to about 50 pounds. I do not think I ever saw, in the ordinary course of working, greater differences in the size of balls than that. Those were about the extremes likely to be found in practice. The ball is plastic when it first comes from the furnace; it is hot and porous; the small blooms made by the Saugerties machine had sound ends. I do not recollect seeing a single end that I should call more than ordinarily unsound; the machine was horizontal; the first operation of it was to smooth the protuberant points, and give the ball a shape approaching a sphere. After the ball begins to be pressed, there is no tendency to turn it up; it will rotate then parallel to its axis; I think the sound ends of the small blooms were made by smoothing the protuberances, as I have mentioned. The blooms, when finished, were about five inches in diameter. I do not think that, in that machine, what is strictly called upsetting, took place. I consider upsetting to be striking on the end. If a bloom is large, upsetting during the process of compression is important; if it is small in diameter, I should consider the upsetting as not important. The small blooms came out perfect.

I understand the principle on which Mr. Winslow's machine works; I consider the difference between Burden's machine and the old modes to consist in its reducing the puddler's ball to a bloom by continuous pressure upon it, as distinguished from intermittent pressure, which pressure is exerted by surfaces by the motion of which, one or both of them, the ball is caused to rotate on its axis, and these surfaces, in order to be in accordance with the principle of the machine, must be such that the points of bearing on the blooms, at any one time, shall be nearer to each other than the points which immediately before bore upon it; or in other words, the surfaces must gradually converge. There is in Burden's machine also the principle of self-action. In this it differs from the former machines. There is a difference between Burden's machine and the old nobbling rolls in this, that in the latter a considerable part of the force exerted on the iron is necessary to draw the iron into the rolls, and that tends to tear or disintegrate the iron by tension on its fibres; whereas in Burden's machine the tendency to disintegrate the ball is, I think, due entirely to pressure, except that perhaps when the ball first enters the protuberances being caught may be torn; the ball elongates parallel to its axis in Burden's machine, and in the other direction in the nobbling rolls.

I think that the definition I have given to Burden's machine will apply to Winslow's machine in the following respects: it has a continuous pressure; the ball rotates on its axis, and the machine is self-acting. The differences between the two machines are, first, and prin-

cipally, in Winslow's having a hammer and 2 bed rollers. There is also a difference between the two in their modes of gearing. In some points Winslow's 2 rollers are exactly the mechanical equivalent for the cylinder in Burden's machine. I consider the curve in Burden's shell as identically the same with Winslow's cam. The difference in action, as I consider it, produced by having the 2 rollers in Winslow's machine, is, that the 2 rollers, in connexion with the cam, produce 3 points of bearing on the ball—3 points of applying pressure. With that difference I consider the 2 rolls of Winslow's as identical with Burden's cylinder. But I consider the rollers, when looking at what I regard as the real essence of Burden's invention, as the mechanical equivalents for Burden's cylinder. I consider them as identical in substance, only differing in matter of detail. I consider Winslow's hammer as not making an essential difference in the machine, from the principle and essence of Mr. Burden's invention. I consider it as the addition of another principle, or the substitute of the hammer for the flanges; because I do not consider Mr. Burden's machine as being restricted to the use of the flanges. The hammer may be considered in some cases as a substitute for one of the flanges, and in some cases as an addition. I think that the only two material points of difference between the 2 machines are in Winslow's having the hammer and the 2 bed rollers. Winslow's reduces by continuous pressure, as distinguished from intermittent; by surfaces in motion, which cause the ball to rotate on its axis. The ball is reduced to a bloom in both machines by the approach of the surfaces to each other.

On being cross examined the said Edward Cooper testified as follows:

The hammer of Winslow is a substitute for Burden's outer flange in his rotary machine. Where Burden had no flange the hammer would be an addition. I find no substitute for the flange suggested in Burden's specification. In speaking of the curved trough he speaks of the flanges. In the reciprocating tables of Burden there are no flanges, or means of acting on the end of the bloom. Burden's side flanges must extend the whole length of his rotary machine, or else he provides no means for acting on the ends of the bloom. I consider the mechanical action of Burden's fixed flanges, on the ends of the bloom, to be the same as those of Winslow's hammer. The difference is one to be estimated by degree rather than a difference in kind. In Burden's rotary machine a hammer could not be substituted for the flanges. I should consider that it required some little thought to adapt a hammer to Mr. Burden's machine. I consider the essential principle of Mr. Burden's machine to be the application of converging surfaces, for the purpose of preparing and forming the mass. The converging surfaces lie at the bottom, and the other results follow. I do not find any expression in Burden's specification, which, if carried out, would provide a means of rotating the ball on its axis by continuous motion, without changing its place. His rotating the ball without changing its place must be confined to reciprocating action, that is, intermittent action of the surfaces

instead of continuous. The hammer could, with difficulty, be applied to one reciprocating surface. I think it would be impracticable. I consider Winslow's hammer and flange as more directly the equivalent of the common anvil and hammer. I do not consider Burden's two flanges as an essential element of his machine. A cam is a common element of machinery; so are cylinders. I have never seen a machine besides Winslow's, in which a cam, two cylinders, and a hammer and anvil, are combined together to produce one result. That combination has the effect, apart from the hammer, to produce pressure at three points of the circumference of the ball. The hammer applies percussion at one end and resistance at the other.

Question. Do you find the same series of mechanical action, as these five so combined, in any one of Mr. Burden's machines?

Answer. There is no percussion in Burden's machine; nor is there pressure there at three points of the circumference at the same time. Mr. Burden has not suggested any plan for making pressure at three points. It would require the introduction of a new element into his machine to do that.

Question. Do you consider self action as a mechanical principle?

Answer. Not strictly speaking.

Question. Is it not a result rather than a means?

Answer. It is undoubtedly a result. Self action in any machine is the result of its organization, and I think it may also be considered as an element of its organization. The mechanical action of condensing by rolling between two parallel surfaces, is old and well known. I do not consider the rolling of bodies between converging surfaces, as an abstract mechanical principle, *is* new. The trip hammer was used as a machine for compressing and shaping metals before the process of puddling was known. I should think it scarcely required invention to adapt the old hammer to reducing a puddle ball. I do not think the mechanical action of the hammer would be changed. I do not think it would follow as a necessary inference that converging surfaces would operate well in working puddle balls. I should consider it highly probable. I should be willing to go to the expense of trying, but should not regard it as certain. The mechanical action on the metal would be the same as in converging surfaces acting on metals before. I should not have to invent the machine, but on account of the application of it, and of the difference in the materials acted on, I should consider it as an invention. I should not consider it as an invention unless some new element were introduced. Every one knows that pressure on puddled iron will expel the impurities. That would not require invention. I have never made any experiments as to the difference between Mr. Burden's machine and the hammer, in making iron. I cannot say whether, where they used Burden's machines in England, they also used the hammer or not. I know some did. I consider a puddler's ball to be wrought iron. I use the words "wrought" iron and "malleable" iron, as synonymous. I consider that simply rounding the end of the bloom is not upsetting it, using that word in its strictest signification. I consider upsetting to be pressing or striking on the end. I think that the

difference, as to the apparent solidity of the iron made by Burden's machine at Saugerties, and of that made by the hammer, was in favor of the former. It looked smoother. I applied no test to it except its appearance. I think the flanges on the Saugerties machine had some tendency to upset in the strictest sense. The mouth of the Saugerties machine is the half of a hexagon. I consider the flanges as described in Burden's specification, as intended to upset the ends of the bloom. If a 50 lb. ball were put into a machine of Burden's, calculated to run a 130 lb. ball, I do not think the side flanges would finish the end. When too large a ball is put in, it will sometimes come out in two pieces, one a perfect bloom, and the other also a perfect bloom, if it be not too small. Burden's machines admit of considerable variation as to the approach of the shell to the cylinder. The machines we have, and all that I have seen, except the one at Saugerties and Thorneycroft's, were horizontal, and had a moveable upset and a flange on the lower side of the cylinder. The one at Saugerties and Thorneycroft's did not have flanges extending all around the shell. Our ore is very good. As a general rule good iron is used for making wire. The wire we make is finer than that made from any other puddled iron. A great deal is due to the process. I think the subsequent processes, after making the bloom, tend to express the impurities from the iron. I have had no experience in the use of a hammer. I have seen it used. I have made no practical test between the hammer and Burden's squeezer. The cost of making balls into blooms with the squeezer in our works is only the cost in keeping the machine in order. It costs more per ton to keep a hammer in order, and then there are the wages of two men, and the risk of breaking the rolls from the bloom getting cold. The puddler puts his ball into the machine himself. It falls down and is taken to the rolls by another man. One hammer would, in my opinion, do the work of ten double puddling furnaces, making twenty tons of iron per day. I consider that Burden's squeezer will do the work of two hammers.

On being again examined by the counsel for the plaintiff, the said Edward Cooper testified as follows:

I consider motion as one of the elements of Burden's machine, and action also as one of its elements. When you add the word "self," that does not make the motion or the action a result instead of an element. Upsetting the end of the bloom is merely adding pressure on the end. It is not a difference in kind.

In answer to an inquiry by the court, the witness said: If a ball were placed between two parallel surfaces, and a weight were put on the upper one heavy enough to make a bloom, and the surface were put in motion, the ball would not roll, but if the pressure were gradual it would roll.

On being again examined by the counsel for the plaintiff the witness said:

I consider the pressure on 3 points a variation in degree rather than in kind. In point of practice I should think it would not be a differ-

ence of any considerable amount. I think Winslow's machine would have a less tendency to break an iron ball than Burden's would.

On being again cross examined, the said Edward Cooper testified as follows:

Where there are 3 points of pressure, the 3 lines of pressure represent a triangle and tend towards the centre, and tend to compact the mass. The breaking of the ball in Burden's machine is owing to the fact that only one of his surfaces revolves. I think Winslow's machine has not as much tendency to break a ball as Burden's has.

The counsel for the plaintiff here rested the case on the part of the plaintiff.

The case on the part of the defendants was then opened to the jury by their counsel.

The counsel for the defendants then offered to read in evidence letters patent of the United States, granted to John F. Winslow, of Troy, New York, dated December 18, 1847, for "a new and useful improvement in rolling and compressing puddlers' balls," together with the specification and drawings thereto annexed; and also letters patent of the United States granted to said Winslow, and dated July 5, 1848, for "a new and useful improvement in machinery for rolling puddlers' balls," together with the specification and drawings thereto annexed; and also offered to show that the machine which the plaintiff had shown to have been used by the defendants, and claimed to be an infringement of said letters patent to said Burden, was the machine described in and covered by said letters patent to said Winslow, one of said defendants. The said letters patent to said Winslow, and their respective specifications, were in the words and figures following, to wit:

No. 5399.

The United States of America, to all to whom these letters patent shall come:

Whereas John F. Winslow, Troy, New York, has alleged that he has invented a new and useful improvement in rolling and compressing puddlers' balls, which he states has not been known or used before his application; has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said improvement, and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the treasury of the United States the sum of thirty dollars, and presented a petition to the Commissioner of Patents, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose.

These are therefore to grant, according to law, to the said John F. Winslow, his heirs, administrators, or assigns, for the term of fourteen years from the eighteenth day of December, one thousand eight hundred and forty-seven, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said

John F. Winslow in the schedule hereunto annexed, and is made a part of these presents.

In testimony whereof I have caused these letters to be made patent, and the seal of the Patent office has been hereunto affixed.

Given under my hand, at the city of Washington, this eighteenth day of December, in the year of our Lord one thousand eight hundred and forty-seven, and of the independence of the United States of America the seventy-second.

JAMES BUCHANAN,
Secretary of State.

[L. S.] Countersigned and sealed with the seal of the Patent office.

EDMUND BURKE,
Com'r of Patents.

Specification of letters patent granted to J. F. Winslow, December 18, 1847, for an improvement in rolling and compressing puddlers' balls.

The schedule referred to in these letters patent, and making part of the same.

To all to whom these presents shall come:

Be it known that I, John F. Winslow, of the city of Troy, county of Rensselaer, and State of New York, have invented a new and useful machine for compressing or shingling puddlers' balls, or loups of iron into blooms, &c., and that the following is a full, clear, and exact description of the principle or character which distinguishes it from all other things before known, and of the manner of making, constructing, and using the same; reference being had to the accompanying drawings, making part of this specification, in which figure 1 is a front elevation of the machine; figure 2 a side elevation; figure 3 a vertical section, taken at line (XX) of figure 1 and figure 4, a like section taken at the line (ZZ) of the same figures; the same letters indicate like parts in all the figures.

The nature of the first part of my invention consists in rolling and compressing puddlers' balls or loups of iron into blooms, &c., by means of a rotating cam-formed compressor, combined with two or more rollers placed near to one another, and at the same distance from the axis of motion of the compressor, so that the compression and elongation of the loups will be due entirely to the eccentricity of the compressor; the whole being so geared that the rollers shall turn in the direction opposite to the motion of the compressor, that the loup may be rotated and retained between the rollers and the compressor; the surfaces of the rollers are formed with slight projections, to take hold of and turn the loup of iron, and the surface of the cam-formed compressor with teeth, which are very large at first, or on that part of the compressor which first acts on the loup to squeeze out the impurities, and at the same time insure the turning of the loup, and then gradually diminished until the surface becomes quite or nearly smooth to finish the bloom.

And the second part of my invention consists in combining, with the

compressor and rollers, two cheeks, one on each side, and provided with springs that force them towards one another, that they may yield to the ends of the loup of iron as it is lengthened out by the action of the compressor and rollers, and at the same time to make sufficient resistance to give a proper form to the ends of the blooms, &c.

And the third part of my invention consists in combining, with the compressor and rollers, a feeder or sliding frame, operated by a projection on the compressor, or the shaft thereof, to carry in the ball of iron between the compressor and roller, as that part of the compressor which is recessed for that purpose comes round to the proper place for the introduction of the ball, and the discharge of the bloom; and also in combining, in like manner, a follower, for discharging the bloom after it has been completed.

In the accompanying drawings, (a) represents the bed plate of the machine, to which are securely bolted four standards or frames, (bbbb,) properly adapted, as represented by the operative parts of the machine. In the lower part of these standards there are two horizontal and parallel shafts, (cc,) coupled in the usual manner of rolling mills, and these carry the two bed rollers, (dd,) placed so near together as just to clear one another in turning; the surface of these rollers is formed with cogs, which project just enough to take hold of the loup of iron (e) and insure its turning. And in the upper part of the frame there is another and parallel shaft (f) which carries the rotating compressor, (g,) the periphery of which is cam-formed, as represented in figure 3; where two red lines represent circles concentric with the shaft, and of a diameter equal to the smallest and greatest diameter of the compressor. The cam-formed surface that acts on the iron commences at (1) at the smallest diameter, and extends around three-fourths of the circumference. It runs out from the axis with a sudden curve from the point, (1) to (2,) for the purpose of squeezing the loup of iron suddenly when first put into the machine, and when in a highly heated state to force out the impurities, and then from the point (2) to (3) it gradually runs out from the axis in the form of a segment of a volute, to act gradually on the iron, and lengthen it out in the direction of the axis of motion, and from the point (3) to (4) where the cam-form ends, it gradually and slightly approaches the axis.

And then from (4) to (1) the point of beginning, it is recessed for the remaining quarter of the circumference, to give room for the discharge of the bloom, and the introduction of a new ball or loup to be acted upon.

From the point (1) to (3) the cam-formed surface is grooved to form cogs, which, from the point (1) to (2,) are very deep, that they may suddenly force their way into the loup of iron, and squeeze out the impurities by an operation somewhat resembling the kneading of dough; and from the point (2) to (3,) the sizes of these cogs or projections are gradually reduced, and from (3) to (4) they gradually disappear to smooth the surface of the bloom; the cam-form slightly approaching the axis as its surface becomes smooth. This is the form which I deem

13/18.

best for the purpose contemplated, but I do not wish to confine myself to it, as it may be varied without changing the principles of my invention.

The shafts of the rollers have each of them a cog pinion, (h,) the two being of equal diameter, that the rollers may turn with equal velocity, and they are turned in the same direction by an intermediate pinion, (i,) which also engages with a cog wheel (f) on the shaft of the compressor, that it (the compressor) may act on the loup of iron (e) in a direction the reverse of the peripheries of the two rollers; and the diameter of the pitch line of the pinions and the cog wheel is such, relatively to the diameter of the rollers and the compressor, as to cause them to act on the loups of iron in opposite directions, and with nearly equal velocities, that the loup may be turned on its axis and retained in proper place between the rollers and compressor.

Above the two rollers, and on the sides of the compressor, are placed two cheeks, (ll,) one on each side; these are plates of metal, with their inner surfaces slightly curved, to upset the ends of the loup of iron when drawn out and forced against them by the action of the compressor; and to enable these cheeks to yield to the gradual elongation of the loup, as the bloom is being formed, these cheeks have each of them two round bolts extending out from their outer faces, and passing through appropriate holes in the standard frames, which act as guides when the cheeks move in and out. Helical springs (m m) surround the bolts, and bear against the inner face of the standard frames, and against the outer faces of the cheeks, to force them towards one another, and to make the requisite pressure against the ends of the iron, and to prevent the cheeks from coming in contact with the sides of the compressor; the outer ends of the bolts have pins passing through them, which check them at the required place. The form which I prefer to give to the inner face of these cheeks, is represented in figures 5 and 6, which are horizontal and vertical sections of one of them taken at the lines (1, 2) and (3, 4) of figure 3; but this form is given merely as a representation of the form which I deem the best, not wishing to limit myself to this form, as it may be variously altered without varying the principle of my invention. At the front part of the machine there is an inclined table, (n,) on which the ball or loup of iron to be worked is placed, and resting against a bar (o) of a feeding frame, which consists of this bar (o) and two arms, (pp,) that slide in ways (g) on each side of the compressor; and the rear ends of the arms are turned up as at (rr,) and there are two pins (ss) projecting from the faces of the compressor, one on each side, and so placed that, so soon as the recess in the compressor reaches the rollers, the pins (ss) strike the turned up ends of the arms of the feeding frame, and roll in the ball or loup of iron to be acted upon by the compressor, and at the same time the formed bloom is forced out by a follower, (t,) which is jointed to one end of a lever (u) that turns on a fulcrum pin at (v,) the other end being jointed to a rod (w) that has a projection on the side of it, that is struck at the proper time by an arm (x) on the compressor shaft to push

the follower forward and discharge the bloom. A spring (y) being connected with the lever to draw back the follower so soon as the bloom has been discharged. The shafts of the rollers turn in fixed boxes, and that of the compressor in boxes that are adjustable by set screws (zz) in the usual way.

It will be obvious from the foregoing, that any slight change may be made in the form of the compressor or rollers, in the manner of mounting them or in the cheeks, and the manner of forcing them up against the ends of the bloom, and in the manner of operating the feeding frame and discharging follower, without materially affecting the principle of my invention, as pointed out above.

What I claim as my invention, and desire to secure by letters patent, is the method, substantially as herein described, of compressing or shingling puddlers' balls or loups of iron into blooms, by the combination of the cam-formed compressor, and two or more rollers, substantially as described.

Secondly, I claim the spring or yielding cheeks, for setting up the ends of the blooms, in combination with the combined cam-formed compressor and rollers, substantially as described.

And, finally, I claim the feeder and discharging follower, in combination with the combined cam-formed compressor and rollers, for the purpose, and in the manner described.

JOHN F. WINSLOW.

S. REYNOLDS, Jr.,
GEORGE DAY, } Witnesses.

To the Commissioner of Patents, the petition of John F. Winslow, of Troy, in the county of Rensselaer, and State of New York, respectfully represents:

That he is the sole and exclusive owner of a right for certain improvements in rolling and compressing puddlers' balls, for which letters patent of the United States were granted to him on the eighteenth day of December, 1847.

That he has reason to believe that, through inadvertence and mistake, the claim made in the specification of said letters patent is too broad, including that of which the said patentee was not the first inventor.

Your petitioner, therefore, hereby enters his disclaimer to that part of the claim, in the aforenamed specification, which is in the following words, to wit: "Secondly, I claim the spring or yielding cheeks, for setting up the ends of the blooms, in combination with the combined cam-formed compressor and rollers, as substantially described."

"And, finally, I claim the feeder and discharging follower, in combination with the combined cam-formed compressor and rollers, for the purpose, and in the manner described.'

Which disclaimer is to operate to the extent of the whole interest in said letters patent, said letters patent being owned solely by your petitioner, who has paid ten dollars into the Treasury of the United States,

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agreeably to the requirements of the act of Congress, in that case made and provided.

JOHN F. WINSLOW.

New York, May 2d, 1848.

CHARLES M. KELLER, A. P. BROWNE, } Witnesses.

PATENT OFFICE, *May* 10, 1848.

I hereby certify the foregoing disclaimer has, this tenth day of May, 1848, been duly annexed to the original patent of John F. Winslow, that the same is duly recorded on the books of the office, and that ten dollars, the duty by law required, has been paid into the Treasury of the United States.

EDMUND BURKE,
Commissioner of Patents.

No. 5660.

The United States of America, to all to whom the presents shall come:

Whereas, John F. Winslow and John Snider, Troy, New York, have alleged that they have invented a new and useful improvement in machinery for rolling puddlers' balls, (the aforesaid John Snider having assigned his right, title, and interest in said improvement to said John F. Winslow,) which they state has not been known or used before their application, have made oath that they are citizens of the United States; that they do verily believe that they are the original and first inventors or discoverers of the said improvement, and that the same hath not, to the best of their knowledge and belief, been previously known or used; have paid into the Treasury of the United States the sum of thirty dollars, and presented a petition to the commissioner of patents, signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose.

These are therefore to grant, according to law, to the said John F. Winslow, his heirs, administrators, or assigns, for the term of fourteen years from the fifth day of July, one thousand eight hundred and forty-eight, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said John F. Winslow and John Snider, in the schedule hereunto annexed, and is made a part of these presents.

In testimony whereof I have caused these letters to be made patent, and the seal of the Patent office has been hereunto affixed.

Given under my hand at the city of Washington, this fifth day of July, in the year of our Lord one thousand eight hundred and forty-eight, and of the independence of the United States of America the seventy-third.

JAMES BUCHANAN,
Secretary of State.

[SEAL.] Countersigned and sealed with the seal of the Patent office.

EDMUND BURKE,
Commissioner of Patents.

Specification of letters patent granted to John F. Winslow and John Snider, of Troy, Rensselaer county, New York, for an improvement in machinery for rolling puddlers' balls, July 5th, 1848, (the aforesaid Snider having assigned his right, title, and interest in said improvement to said John F. Winslow.)

The schedule referred to in these letters patent, and making part of the same.

To all to whom these letters patent shall come.

Be it known, that we, John F. Winslow and John Snider, have invented new and useful improvements in the machine for rolling or working puddlers' balls into blooms, in the manufacture of iron, and that the following is a full, clear, and exact description of the principle or character which distinguishes them from all other things before known, and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this specification, in which figure 1 is a front elevation of the machine; figure 2 a side elevation; figure 3 a vertical section taken of the line (XX) of figure 1, and looking towards the hammer; and figure 4 a horizontal section thereof taken at the line (*zz*) of figure 1, that is, at a plane above the bed rollers and below the eccentric squeezer. The same letters indicate like parts in all the figures.

In this machine the operation of squeezing and rolling the ball of iron is effected by an eccentric roller, combined with rollers that form a concave, as secured to John F. Winslow by letters patent of the United States, granted on the eighteenth of December eighteen hundred and forty-seven, but in that machine side cheeks not attached to the concave rollers were used to prevent the iron from spreading out at the sides; this was, however, found to be defective, for the reason that the iron under treatment would be forced in between the rollers and the cheeks, and thus injure the machine and its operation. The principle of the invention for which we now ask letters patent, consists in preventing the bloom of iron from spreading out too far at the ends, and then "upsetting the iron," as it is termed, by making one of the rollers that form the concave with a flanch against which one end of the bloom shall bear as it spreads out in the squeezing operation; and also in combining with the flanched roller for this purpose a hammer, as it may be termed, which acts on the other end of the bloom by a reciprocating motion to strike that end of the bar, and thus effectually upset the iron, and give the required form to the bloom or bar, or block of iron, during the squeezing or rolling operation.

In the accompanying drawings (*a*) represents the frame of the ma-

chine properly adapted to the intended purpose, but which may be varied at pleasure. In appropriate boxes (*bb*) between the standards of this frame run the journals of an eccentric roller (*c*,) the periphery of which is cam-formed and provided with cogs, as represented in the accompanying drawings, for the purpose of squeezing the ball of iron and forcing out the impurities, and gradually reducing its diameter, and elongating it. For a more particular description of the form, principle, and mode of operation of the squeezer, reference is made to before recited letters patent. Below this squeezing roller are arranged two fluted rollers, (dd,) whose journals are fitted to appropriate boxes in the frame. These rollers constitute the concave on which the ball of iron rests during the operations of the squeezer; cog wheels (e, f, g, h,) being employed to connect the shaft of the rollers with the shaft of the squeezer in such manner as that the peripheries of the two rollers (dd) shall turn in the same direction, and that of the squeezer in a reverse direction, and thus cause the ball or mass of iron, during the operation of squeezing, to rotate about its axis, or nearly so; the requisite power for this purpose being communicated to the machine from some first mover in any efficient manner. One of the bottom rollers (d) has a strong flanch (i) on one side, which projects sufficiently to pass within the periphery of that part of the squeezer which acts on the iron after it has been so much elongated as to have one of its ends approach the flanch, and therefore towards the end of the operation of the squeezer that end of the bloom or mass of iron which is towards this flanch will be upset by it and properly formed. On the side of the machine opposite the flanch (i) is a hammer (j) on the end of a bar (k) which slides in collars (l.) The face of this hammer is smooth, and made as hammers for working iron usually are, and its edges are adapted to the peripheries of the two rollers (dd) and to that part of the periphery of the squeezer which acts on the bloom at the time the hammer is to strike the ends of the bloom. A strong helical spring surrounds the bar (k) of the hammer, one end bearing against one of the collars (l,) and the other against the back of the hammer, so that its tension will always force the hammer towards the flanch (i) of the roller (d) and towards the outer end, the said bar (k) is provided with a spur (m,) the inner face of which is slightly rounded to bear against the face of a cam (n,) so formed that at each revolution of the bottom rollers it gives the hammer two blows upon the bloom, and at every revolution of the rollers the spring is liberated and the hammer strikes the bloom and thus upsets the ends, the flanch (i) in this part of the operation performing the office of an anvil; the face of the cam is then made in the form of an inclined plane to draw back the hammer preparatory to another operation.

Instead of forcing the hammer towards the bloom by a spring and drawing it back by a cam, this arrangement may be reversed by making the spring simply of sufficient length to draw back the hammer, and reversing the cam that it may force the hammer towards the bloom at the required time. And if desired, a lever, operated in any desired manner, such as by a cam or crank, may be used to operate the ham-

mer instead of a cam, and under this latter modification the spring may be dispensed with altogether by connecting the hammer bar with the said lever.

Having thus described the principle of our invention, its mode of operation and construction, and the various modes in which we have contemplated the application of the principle by which it may be distinguished from all other things before known; what we claim as our invention and desire to secure by letters patent is the employment of a flanch on one of the rollers of the concave and rotating with it to prevent the bloom or block of iron from spreading out, and to "upset it," substantially as described, when this is combined with the eccentric or cam-formed squeezer, as described. And we also claim the employment of the hammer to strike and upset the bloom or block of iron, substantially as described, where this is combined with the flanch that performs the office of an anvil, substantially as described, whether the said flanch be used in the combination herein described, or in any other effecting the same purpose.

JOHN F. WINSLOW,
JOHN SNIDER.

Witnesses—
R. THOMPSON,
NATHAN UPHAM.

To the reading of the said respective letters patent, specifications, and drawings in evidence, and to the introduction of the said evidence so offered, the counsel for the plaintiff then and there objected, on the ground that the said letters patent, specifications, and drawings, and the said evidence so offered, were irrelevant to any issue in this action. And the said judge did then and there declare and deliver his opinion that the said objection so taken by the said counsel for the said plaintiff ought to be allowed, and that the said letters patent, specifications, and drawings ought not to be read in evidence, and that the said evidence so offered ought not to be admitted; and did accordingly decide that the said letters patent, specifications, and drawings should not be read in evidence, and that the said evidence so offered should not be admitted; to which said opinion and decision of the said judge the said counsel for the said defendants did then and there on behalf of the said defendants except; and the said letters patent, specifications, and drawings were not read in evidence, and the said evidence so offered was not admitted.

The counsel for the defendants then read in evidence letters patent of the United States granted to Thomas Bruff, dated June 4, 1813, for a new and useful improvement, being a machine for making shot, bullets, &c., by pressure, together with the specifications thereto annexed. The said letters patent and specification were in the words and figures following, to wit:

THE UNITED STATES OF AMERICA

To all to whom these presents shall come.

Whereas, Thomas Bruff, a citizen of the United States, hath alleged that he has invented a new and useful improvement, being a machine for making shot, bullets, &c., by pressure, which improvement he states has not been known or used before his application; has made oath that he does verily believe that he is the true inventor or discoverer of the said improvement; hath paid into the treasury of the United States the sum of thirty dollars, delivered a receipt for the same, and presented a petition to the Secretary of State signifying a desire of obtaining an exclusive property in the said improvement, and praying that a patent may be granted for that purpose: These are therefore to grant, according to law, to the said Thomas Bruff, his heirs, administrators, or assigns for the term of fourteen years from the fourth day of June, 1813, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said improvement, a description whereof is given in the words of the said Thomas Bruff himself in the schedule hereto annexed, and is made a part of these presents.

In testimony whereof I have caused these letters to be made patent, [L. S.] and the seal of the United States to be hereunto affixed.

Given under my hand, at the city of Washington, this fourth day of June, in the year of our Lord one thousand eight hundred and thirteen, and of the independence of the United States of America the thirty seventh.

JAMES MADISON.

By the President,

JAMES MONROE, *Secretary of State.*

CITY OF WASHINGTON, *to wit:*

I do hereby certify, that the foregoing letters patent were delivered to me on the fourth day of June, in the year of our Lord one thousand eight hundred and thirteen, to be examined; that I have examined the same, and find them conformable to law; and I do hereby return the same to the Secretary of State within fifteen days from the date aforesaid, to wit, on this fourth day of June, in the year aforesaid.

WILLIAM PINKNEY,
Attorney General of the United States.

The schedule referred to in these letters patent, and making part of the same, containing a description in the words of the said Thomas Bruff himself, of his machine for making shot, &c., by pressure.

This machine for making pressed shot from flat bars of lead consists of two slitting and one pressing roller with its curve, all of steel, case-hardened iron, or hard brass, in a frame of metal. The slitting rollers

are placed horrizontally; at the top are grooves lengthwise, with almost half circular grooves, a little widened at the top to let the lead pass freely from them to the pressing part beneath. The grooves in each roller are exactly alike and facing each other all round, so as to slit the bars crosswise almost as round as wire. Between the grooves a plain space is left about the width of a small pin-head, where the lead between the wires is compressed to the size of thin paper, for the purpose of holding the pieces together till it conducts them to the mouth of the pressing roller and curve. The pressing roller should be about a third larger than the slitting rollers, and placed with the top or mouth of the curve, immediately under the dividing line between them, to receive the slitted bar as it comes from them. This roller is grooved round its circumference in perfect half-circular grooves, so near each other as to bring the metal almost to an edge between, and as many in number as will comprise the width of the bar, making them about a sixth wider than the groove of the slitting rollers, to allow for the increase of diameter of the shot as they are formed. On one side of the pressing roller is the curve grooved like the roller, with the grooves facing each other; it is fixed to the frame, and follows the circle of the roller, except a gradual widening from near the middle to the top; leaving a space between at top, sufficient to receive one piece at a time of the leaden wire or slitted bar as they come from the slitting rollers. The length of the curve must be in proportion to the size of the shot to be made by it, which, to make them perfectly round, must be rolled over twice between the roller and the curve, after it leaves the diverging and dividing part at the top, and the curve should be gradually turned a little outward at bottom, to give the shot an easy delivery from the grooves.

The slitting rollers have small cogs on one end to make them keep pace with each other, and on the other end of one of them, and on one end of the pressing roller are other two cogs of equal size; and when force is applied to the handle of the pressing roller they all move together; and the pressing roller moves one-third faster than the slitting rollers in consequence of its greater diameter, and gives room for the pieces to move clear of each other. When the cross slitting is performed by the upper rollers, and the bar suspended from them by the thin plate between the slitted pieces to the mouth of the pressing part, the motion of the pressing roller draws them into the mouth of the curve, takes them off one by one, divides and rounds them into perfect shot, and rolls them out at the bottom of the machine. The casting apparatus consists of iron ingots, and a cauldron set over a furnace for melting the lead and heating the ingots at the same time. The number of ingots will depend on the number of bars to be cast at a melting; they should be from two to two and a half feet in length, may be made of any width, with divisions the exact breadth of the bars intended to be cast. The breadth of the bars must correspond with the length of the grooves in the slitting rollers, and their thickness just the diameter of the shot intended to be made from them.

The ingots are made in two flat plates, one of them plain, except a

moulding at the top and knob at bottom, to keep the next one at a proper distance from it; the other like it, except a projection on the inside of the sides and bottom, the thickness of the bar, and about half an inch from the edges, to admit of looming being rubbed in between them with the finger to keep them perfectly tight. The moulding on the top and knob on the bottom, outside of the ingots, must be about half an inch deep to keep them far enough asunder to admit the heat from the fire of the furnace to pass freely between them, that they may be heated to the top. The tops must be squared and levelled to form an even surface when set in their frames. They are set perpendicularly on one or both sides of the cauldron, their bottoms resting on arches of cast iron in rows pointing toward the cauldron, with their feet on flat cast iron plates, placed horizontally with the bottom of the furnace; the upper edges of these arches straight, that the ingots may stand perfectly level on them. The ingots are enclosed in a tight iron frame at top, and the wall of the furnace on the outside and ends. If the dipping ladle and striker are used, the top of the cauldron may be almost level with the tops of the ingots; and the bars when drawn, may be trimmed to the pattern in a gauge-box, with a cutter like a straw-knife working on a pin. When draws are necessary for nicer work, they may be of cast iron or brass, and large enough to cover all the ingots on one side of the caldron, or in convenient divisions. Each draw consists of a flat plate to rest on the tops of the ingots, having holes pierced in them, corresponding in size and form with the open tops of the ingots, and directly over them. They must have a high edging around them, to keep in the superfluous lead, the lead to be discharged from a spout or cock over each draw; and when the ingots are charged, the draw must be moved forward a little more than the breadth of the holes, and left to cool. To use this machine, it is only necessary, when a moderate force is applied, to put the end of a bar, made as above directed, into the mouth of the conductor at top, and you have nothing to do but to receive the shot into a bag or box at bottom. By adding a wooden frame with a sloping bottom toward the conducting groove, you may place almost any number of bars reclining against the first, and they will succeed each other in passing the conductor, and will all be worked into shot in succession. To give the shot a high polish, the method used in the drop factories is sufficient—to turn them gently in a large iron cylinder about ten minutes, with a little powder of black lead.

THOMAS BRUFF.

Witnesses—WILLIAM THORNTON,
GEORGE LYON.

The originals or certified copies of said letters patent, specifications, and drawings, may be produced and used by either party on any argument to be had on this bill of exceptions.

Circuit court of the United States. for the northern district of New York.

ERASTUS CORNING and John F. Winslow ads.
PETER A. BURDEN.

The counsel for defendants then read in evidence the deposition of Ebenezer A. Lester, in the words and figures following, to wit:

DISTRICT OF MASSACHUSETTS,
City of Boston, September 5, 1849.

Ebenezer A. Lester, being duly sworn, did depose and say: I am a machinist and steam engineer; in 1814 I commenced as a worker in iron; I am now the superintendent of the South Boston iron company, in their foundry and gun department; I have seen the puddling of iron done to some extent, and have general acquaintance with the manufacture and the properties of iron; I have examined the printed copy of the specification of the patent granted to Henry Burden, in 1840, December 10, and attached to the deposition of Mr. Bradbury, and a certified copy of the drawings of said letter patent.

I consider the machine to be a cylinder and a segmental trough, the trough gradually approaching the cylinder, and contrived for the purpose of changing the puddler's ball into a cylindrical bloom; the form of the trough seems to be a semi-circle or more at its mouth, and to increase in width, and lessen in depth, as it continues towards its place of delivery, where it is parallel to the axis of the cylinder; the sides of the trough seem fixed on the trough, and not adjustable to suit the various qualities of metal which may be placed in it for the purpose of upsetting the bloom endwise; I should think it was not practicable to make puddling balls of equal size; if the ball put into the machine was too large it must clog the machine, and it might stop the machine, or break up the ball into pieces, or break the machine; and if too small it would pass through imperfectly worked, and produce an imperfect bloom; this machine would require a particular size and weight of puddlers' ball to do its work perfectly; I do not see any representation of corrugated surface for the interior of the concave, or the surface of the cylinder in the drawing; it is mentioned in the specification as to the cylinder; this model C. L. W. I. differs from the drawing of Burden's patent in this, the concave or trough has no sides or flanges for upsetting the iron; the inner face of the concave, instead of the semi-circle mouth, has one parallel to the axis of the cylinder; the device in this model for upsetting the ends of the bloom are on the lower part of the cylinder a permanent flanch, on the upper part a moveable plate, placed above the cylinder with its edge projecting beyond the periphery of the cylinder; neither of which are specified in his letter patent. The moveable plate I suppose is made moveable up and down on the axis, that when the bloom is sufficiently elongated to touch the plate, the weight of the plate acts to upset the

end of the bloom. There is a further use in this moveable plate, that enables the bloom to be elongated, a greater or less degree as the mass of iron may require. This effect cannot be produced by the machine described in Mr. Burden's letter patent and drawings.

In 1811 I was at the city of Washington for the purpose of taking out a patent for a nail machine of my invention; I have the receipt for the fee I paid into the Treasury, and it is dated April 7th, 1811, at which time I was in Washington; whilst there I called on a Doctor Bruff, a resident of that city, who showed me several of his inventions; among them was one, which I understood from him he had a patent for; it was a machine for making shot or musket balls of lead, by compression of material; I have made this model from memory of this machine; it pleased me much at the time, and impressed me strongly; a drawing of the model, made under my inspection, I append to my affidavit; I saw Doctor Bruff put this machine in operation and make buck shot from small cylinders of lead. This machine has a cylinder with three grooves and an adjustable concave with corresponding grooves; the periphery of the concave gradually approaching the periphery of the cylinder, from the end where the lead is fed, into the end where the balls are delivered in a finished state, except a small wire of lead or flin connecting, because the edges of the grooves did not entirely touch. I consider there is no difference in the principle or mode of operation of Bruff's machine and that patented by Burden, except that Bruff's has this advantage, his adjustable concave enables him to free his machine, when clogged, without injury.

The model of the machine patented by J. F. Winslow is now before me; there are two cylinders or rollers with roughed or fluted peripheries in the same horizontal plane, so arranged as to receive the mass of iron, and geared together so as to revolve in the same direction, and above them is placed a rotating cam or scroll, (not a cylinder,) so geared as to revolve in an opposite direction from the cylinders; the rotation of the cam and of the two cylinders in opposite directions having the effect to retain the ball in its bed while it turns it; the gradual approach of the periphery of the cam to the periphery of the cylinders, gradually compressing and elongating the mass of iron; the ball being turned by the rotating action of all the surfaces by which it is compressed, being held in the same bed all the while, and under the eye of the operator. The ends of the blooms are upset by, on one end a flange attached to one of the cylinders, and on the other end by a horizontal sliding hammer, operating by a cam and spring.

The machine of Mr. Winslow varies from that of Mr. Burden in this, that the iron is compressed between three rolling bodies instead of one, and the stationary segmental trough. In Winslow's the ball is acted on in three points, giving much greater advantage in rotating and compressing the iron; the tendency, in Mr. Burden's, acting on only two opposite points, is more to flatten the mass than to compress. The

ball of iron operated on is always within the reach and control of the operator in Mr. Winslow's, and is always kept in a parallel position; whilst in Mr. Burden's it travels around with the cylinder, beyond the sight and control of the operator; and another advantage is, that by retaining the mass of iron in the same position the hammer is used to upset the end, which can not be done in Mr. Burden's machine; the use of the hammer I consider a very essential advantage over the means used by Mr. Burden's; with a hammer you can upset the bloom to any required degree the operator considers necessary, and it would do its work more effectually and better than could be done by the means described by Mr. Burden; the operator can regulate the action of the hammer to the occasion; in Mr. Burden's no such control can be had over the upsetting the ends of the bloom. I consider Mr. Winslow's machine far more perfect for producing perfect work than the other; I do not consider the mechanical principles of the machines alike at all; in Mr. Winslow's machine the ball is free to elongate to any extent required, and the machine is not liable to clog or break the balls.

Between Mr. Burden's machine and that of Dr. Bruff's the difference which exists is, that Dr. Bruff's is adapted for rolling a sphere, and the grooves are parallel with the periphery, whilst Mr. Burden's (model C, L, W, I,) is adapted for rolling cylinders; reverse the grooves and Dr. Bruff's will roll cylinders and Mr. Burden's roll shot or balls. This arrangement of the grooves suggests itself naturally according to the work to be done, and there is no invention required in making the change. The difference between them is the mere mechanical formation of the surfaces, as in the rollers for sheet iron and for bar iron. In this I except the advantage Dr. Bruff has in the adjustable character of his concave. The machine of Mr. Winslow could not be so changed as to make shot or a ball, even if grooves were turned in the surfaces of the two bottom rollers and the eccentric or cam, as the ball would inevitably drop out of the machine between the two bottom rollers, and the groove in the eccentric or cam would not be in constant contact with the ball on the bottom rollers, and consequently would not keep the ball in place, and if reduced nearly to a sphere would be below the surface of the cam, and of course would not be operated on by it, rendering it impossible to make a bullet or sphere.

EBENEZER A. LESTER.

The counsel for the defendants then called as a witness Leonard Platt, who, being sworn, testified as follows:

I have been a machinist from 20 to 25 years; I have been engaged in the manufacture of buttons a very considerable portion of my life at Waterbury, in Connecticut, where I now reside; I invented machinery for milling the edges of buttons in the latter part of 1831, I think; it operated on the edges of the buttons by the reciprocating motion of a bar, there being another stationary bar, and each bar having a groove in it to receive the edge of the button; this is a representation of all the essential parts for forming the edges of the buttons; the surfaces of

the bars were nearer together at the point of delivery than at the point of entrance; they gradually approached; the object of that was to compress the button and form the edge and make it the right shape; the button was carried through by the pressure on the edges; it rolled around on its axis, and was carried from one end to the other; the form of the grooves prevented the metal from spreading out at the sides; I set the machine going, and it remained in operation for many years to my knowledge, and I suppose it is now in operation. Another machine on that plan was built by Mr. Hoadley some months afterwards; my brother, Alfred Platt, also made a machine at Waterbury for milling buttons; this is a model of it so far as the shell and grooves are concerned; the feeding part is omitted; the buttons were fed in at the top; this machine was part put up by my brother from four to six months after I finished the first one; it was as soon as the middle of 1832; my brother afterwards made another, which he placed in a different position; this machine was fed by a tube; in both of these rotary machines the surface of the shell gradually approached the surface of the cylinder as much as was necessary to make the buttons; there were two places to feed the second rotary machine; the buttons went through in a perfect stream; these rotary machines are still in constant use; I have noticed them both within a short time; to make them roll any other form, it merely requires that the form of the grooves shall be varied to suit the form required; I think such change would not require the exercise of any thing more than common judgment. Buttons were edged by being filed in a lathe by hand before I introduced this machine; this machine effected a very considerable saving in the manufacture of buttons; the shells could be set nearer or farther off in the rotary machines.

On being cross examined, the said Leonard Platt testified as follows:

I do not know who made these models; I first saw them at the public house here a short time since, during this term of the court; the buttons of which I have spoken were made of brass; the buttons made in the first and second machines of which I have spoken were mostly of brass or a composition of brass; those made in the third machine were mostly of zinc; the button was a round piece of metal, called a blank, punched out of a sheet of brass; the object of the machine was to form the edge of the button, not to polish it; nothing had been done to it before but stamping it; this machine thickened the button somewhat; it thickened it a little way back from the edge; the button was cold.

On being again examined by the counsel for the defendants, the said Leonard Platt testified as follows:

The degree of the thickening of the edges was in proportion to the convergence of the two surfaces.

On being again cross examined, the said Leonard Platt testified as follows:

The button was a very little smaller when it came out than when it went in; the action of the machine was mostly to thicken the edge; the diminution in the size of the button was more visible to the eye than it was by measurement, for the driving back of the edges made

ball of iron operated on is always within the reach and control of the operator in Mr. Winslow's, and is always kept in a parallel position; whilst in Mr. Burden's it travels around with the cylinder, beyond the sight and control of the operator; and another advantage is, that by retaining the mass of iron in the same position the hammer is used to upset the end, which can not be done in Mr. Burden's machine; the use of the hammer I consider a very essential advantage over the means used by Mr. Burden's; with a hammer you can upset the bloom to any required degree the operator considers necessary, and it would do its work more effectually and better than could be done by the means described by Mr. Burden; the operator can regulate the action of the hammer to the occasion; in Mr. Burden's no such control can be had over the upsetting the ends of the bloom. I consider Mr. Winslow's machine far more perfect for producing perfect work than the other; I do not consider the mechanical principles of the machines alike at all; in Mr. Winslow's machine the ball is free to elongate to any extent required, and the machine is not liable to clog or break the balls.

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the bars were nearer together at the point of delivery than at the point of entrance; they gradually approached; the object of that was to compress the button and form the edge and make it the right shape; the button was carried through by the pressure on the edges; it rolled around on its axis, and was carried from one end to the other; the form of the grooves prevented the metal from spreading out at the sides; I set the machine going, and it remained in operation for many years to my knowledge, and I suppose it is now in operation. Another machine on that plan was built by Mr. Hoadley some months afterwards; my brother, Alfred Platt, also made a machine at Waterbury for milling buttons; this is a model of it so far as the shell and grooves are concerned; the feeding part is omitted; the buttons were fed in at the top; this machine was part put up by my brother from four to six months after I finished the first one; it was as soon as the middle of 1832; my brother afterwards made another, which he placed in a different position; this machine was fed by a tube; in both of these rotary machines the surface of the shell gradually approached the surface of the cylinder as much as was necessary to make the buttons; there were two places to feed the second rotary machine; the buttons went through in a perfect stream; these rotary machines are still in constant use; I have noticed them both within a short time; to make them roll any other form, it merely requires that the form of the grooves shall be varied to suit the form required; I think such change would not require the exercise of any thing more than common judgment. Buttons were edged by being filed in a lathe by hand before I introduced this machine; this machine effected a very considerable saving in the manufacture of buttons; the shells could be set nearer or farther off in the rotary machines.

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The degree of the thickening of the edge was in proportion to the convergence of the two surfaces.

On being again cross examined, the said Leonard Platt testified as follows:

The button was a very little smaller when it came out than when it went in; the action of the machine was mostly to thicken the edge; the diminution in the size of the button was more visible to the eye than it was by measurement, for the driving back of the edges made

the button look smaller than it really was. The button was thickened up, say one-tenth of an inch from the edge.

The counsel for the defendants then read in evidence the depositions of Alfred Platt, Franklin Peale, Ebenezer Bradbury, Joseph Nason, Henry Brevoort, and Philip D. Borden, in the words and figures following, to wit:

NORTHERN DISTRICT OF NEW YORK.

CORNING & WINSLOW ads. BURDEN.

I, Alfred Platt, of Waterbury, in the district of Connecticut, do depose and say, that I am a machinist by occupation; I saw the machine invented by my brother, Leonard Platt, for rolling buttons, at the time he was constructing it, and when it was first put in operation. The drawing hereto attached, marked No. 1, is a correct representation of that machine. I heard the description of it given by my brother in his deposition just given, and it conforms to my view of that machine. According to the best of my recollection, my brother's machine was put in use during the month of December, 1831. The drawing hereto attached, marked No. 2, is a correct representation of a machine I constructed after my brother's machine was in use, for the same purpose. On an examination of my books, I have ascertained that this last machine was commenced in January and completed in June, 1832; and I recollect I had just got it into operation on the appearance of the cholera at New York. I differed from my brother's machine in using a wheel instead of a vibrating bar, and having the plates (B) eccentering, to make the surfaces converge to compress the metal and form the edges. The form of the grooves were changed to suit the form of the button intended to be produced. The end of the plate (B) farthest from the periphery of the wheel, was made with space sufficiently wide to receive the blanks freely. That machine was put in use in June, 1832. I superintended its operation for six years and more, and I saw it in operation yesterday. The drawing No. 3 represents another machine for the same purpose, which I constructed and completed in August, 1839, as I have ascertained from my books. The only difference in this last machine from the previous one, is in its having the wheel on a vertical shaft in place of the horizontal one, and in the mode of feeding. The form of the grooves, the periphery of the wheel and plates, (B,) can be changed to suit the kinds of work to be produced. The second machine worked gilding metal and brass; the third worked brass, tin, zinc, and iron. And further deponent saith not.

ALFRED PLATT.

Copies of the original depositions taken by

CHARLES R. INGERSOLL,

U. S. commissioner, Mitchell's building, New Haven, Ct.

NORTHERN DISTRICT OF NEW YORK.

CORNING & WINSLOW
ads.
BURDEN.

Franklin Peale.—I am fifty-three years of age; I reside in the city of Philadelphia, in the eastern district of Pennsylvania. I am chief coiner in the mint of the United States in the said city of Philadelphia. Being shown the drawing No. 1, hereto attached, the witness says, this is a correct representation of a milling machine formerly used at the United States mint in Philadelphia. The mode of operation of this machine was, the slide A was moved back and forth in the direction of the arrows, by means of a rack and pinion set in motion by the winch handle, marked F. The point e of the die d' attached to the slide A, is moved to the left to small a; the planchet, or blank, is then introduced between the stationary die d and the moveable die d'; the motion of the slide A is then reversed, and the planchet, letter a, is rolled and compressed between them, so as to give the requisite degree of milling. It is carried forward by its rotary motion, and delivered at the point e.

The surfaces of dies d and d', which act upon the metal blank, are made to converge in the direction in which the planchet a moves while being compressed; the amount of this convergence is regulated by the screws b. The periphery of the planchet, after it has passed between the dies, has received a form corresponding to the shape of the grooves in the dies d and d', and these grooves may be modified in form to give any desirable form to the edge of the planchet. The object of milling the planchet, is to thicken and compress the edge by reducing it in diameter. Other reciprocating machines have been used in the United States mint, operating on the same principle, slightly modified in form; they have been used both vertically and horizontally.

The witness being shown drawing No. 2, hereto attached, says:

This drawing is a representation of those parts of a rotary milling machine, which act upon the metal planchet; it is such as is now used in the United States mint. The wheel, marked A, revolves in the direction shown by the arrow, the periphery of which is provided with grooves, which correspond with the grooves in the fixed dies B. The planchet is introduced between them at the point a, and discharged at the point c; the end of the die B at c, is nearer to the wheel A than at the end a, for the purpose of compressing the planchet to the requisite diameter and shape. The principle of acting upon the metal is the same in both machines—in all those machines—namely, by rolling and compressing the metal between converging surfaces, as before described. These machines operate in the same manner on all the metals employed in coinage.

I have been connected with the United States mint since the year 1833; previous to that time the reciprocating mill, described in drawing No. 1, hereto attached, had been in use, and was continued in use

until the year 1835 or 1836, I am unable to say which, when it was superseded by the rotary mill described in drawing No. 2, hereto attached. According to my best information and belief, reciprocating milling machines have been in use in the mint of the United States since its commencement; I have also, in the years 1833–'4, seen circular reciprocating milling machines in France.

F. PEALE.

CIRCUIT COURT OF THE UNITED STATES,
For the northern district of New York.

CORNING & WINSLOW
ads.
BURDEN.

DISTRICT OF MASSACHUSETTS,
City of Boston, Sept. 5, 1849.

Ebenezer Bradbury.—I reside in the town of Newton, in this State, and do business in Boston; my original trade was the working of fine metals; from this I diverged into the construction of original machinery, and have been ten or fifteen years engaged in this; I have been in the iron furnace and smelting business, but know nothing of puddling iron by personal experience and practice, and a little from observation. I have been more than twenty years engaged in working iron, cold and hot; I never was engaged in converting pig metal into bar iron; I have examined a printed copy of the patent granted to Henry Burden, December 10, 1840, and the drawings attached to the certified copy. I annex a printed copy by which I have been examined; I think I understand the drawings; the essential principles by which the result is effected are rolling the ball between surfaces which approach each other; one surface here is stationary, the other moves; the sides of the concave are formed by being fixed and permanent, always remaining at the same distance from each other, and lack any provision for conforming to the varying lengths of the mass as it is operated on. In puddling iron, I should think it impracticable to make the puddling ball always of the same size; in rolling a puddler's ball in this machine, if it were too small for the machine, the effect of upsetting the ends of the ball would be lost; if the ball was too large, the effect would be either to stop the machine or compress the ball into a flattish mass. I think if the mass was flattened in excess, the mass would not pass through the machine. This model, marked C. L. W. I., *of* a machine for rolling puddlers' balls. The first obvious difference between it and the drawing in Burden's patent, is, that the concave where the ball enters is straight, and parallel with the axis of the cylinder, whereas the concave of the drawing is circular, and adapted to receive a spherical body. In the model, the sides which are to upset the ends of the bloom, one is an independent ring, the other is attached to the cylinder as a permanent flange; the independent ring is moveable and free, so as to adapt itself to the varying lengths of the bloom.

Prior to 1840, I have seen a machine for reducing the diameter of

circular pieces of metal, by passing them between a rotating cylinder and an eccentric concave. I saw it in the mint at Philadelphia, used for milling coin; I saw it from 1834 to 1838, several times. The general principles of this machine and Burden's patent are precisely the same, so far as regards reducing the diameter, the piece rolled lying on a flat surface like the lower flange of model referred to, and free to thicken as the diameter is reduced.

I have examined a model of [a] machine patented by J. F. Winslow, Troy, New York; by this model the ball is compressed by the eccentricity of the revolving body, which may be called a cam, it (the ball) being held on the other side by two revolving cylinders. One advantage of this model over Burden's is, that the ball is compressed between these points by the cylinder and cam, instead of two, thus securing greater certainty of rotation, and less danger of disintegration of the mass; the two cylinders form a trough in which the ball lies, securing its parallelism during the operation; another advantage is, that the mass operated on in the machine always remains in sight of the operator. In Burden's machine, during the operation, it is concealed from sight. Another advantage over Burden's machine, which this model displays, is, that the bloom is upset by a hammer, the force of which may be regulated at pleasure; the arrangement of the cylinders being such as to retain the bloom in the right position to receive the blows of the hammer. Winslow's machine resembles Burden's in one particular only, that the surfaces between which the mass is rolled are constantly approaching; and an essential difference is, that all the surfaces in Winslow's revolve with the moving mass of the bloom, while in Burden's one of them *are* stationary. I regard this as a very essential difference. This gradual approach of the surfaces, for purposes of compression of the mass rolling between, is not novel to either [of] these machines, but exists equally in that for milling coin at Philadelphia, before referred to by me.

EBEN'R BRADBURY.

CIRCUIT COURT OF THE UNITED STATES,
For the northern district of New York.

CORNING & WINSLOW ads. BURDEN.

DISTRICT OF MASSACHUSETTS,
City of Boston, Sept. 5, 1849.

Joseph Nason.—I reside in the city of Boston; am an engineer. I have had no practical experience in puddling or rolling iron; my knowledge of these has been obtained by observation in this country and in England. I have a practical knowledge of the properties of iron; I have examined the patent of Mr. Burden for rolling puddlers' balls; I consider its leading principle to be the action of compression on these balls, by two converging surfaces, one fixed, the other revolving; the

ends of the bloom *is* upset by flanges; the iron is prevented from elongating by the fixed sides of the concave; the inner face of the concave, at the point where the ball enters, is shown considerably larger than the ball, and it would appear by this that the ball does not fill the concave till it has passed nearly through where the upsetting process commences. The form of the concave represented in the drawings being correctly described in the specification, if a ball were put into the mouth too large for the place of delivery, I should think the resistance on the end so great as to hold the ball fast, and it would be flattened on the face of the machine without passing through the machine; if the ball were so small as not to fill up the delivery mouth, the ends of the bloom would be stragglingly formed and imperfect, so that in the subsequent process of rolling, a portion of the bloom would be wasted.

The model (C. L. W. I.) now before me I have examined; it differs from that described in Mr. Burden's patent essentially; the surface of the concave is parallel to the surface of the cylinder throughout its length in the direction of its axis; instead of the fixed flanges for confining the ends of the bloom, the cylinder has a flanch affixed to it and moving with it; the other flange is loose on the shaft of the cylinder, and free to move in the direction of its axis, so as to acommodate itself to the varying lengths of the blooms which are acted upon between the cylinder and the concave.

These variations adapt the machine to upset the ends of the blooms made from balls of various sizes; this model of the machine of Mr. Winslow's now shown to me I have examined; its mode of operation I consider to be essentially different from the other heretofore spoken of; the ball to be acted upon rotates in the same place; all the surfaces which act upon the ball are rotative; the ball, instead of being acted upon on its two opposite sides, is compressed at three points of its circumference between a rotating cam and two rotating cylinders; thus retaining the mass of iron in the same position, and in view of the operator.

The mode of upsetting the ball of iron in Mr. Winslow's machine: In consequence of thus keeping the ball in one position, its ends may be upset by a hammer, ram, or other analogous means, which could not be the case in Burden's machine, which hammer adapts itself to the varying lengths of the bloom.

The advantage which Mr. Winslow's machine has over Mr. Burden's machine consists in allowing the ball to be acted upon in one place, so that it is always under the control of the operator, and admits the use of a ram or hammer to upset the ends. I also consider the compression of the ball at three points instead of two to be an important advantage, because there is more tendency to compress and less to flatten; in consequence of all the surfaces of this machine rotating, there will be less tendency to disintegrate or mutilate the ball than if one of the surfaces was stationary and the other moveable; also the iron mass or ball, if not satisfactorily operated at one revolution of the cam, it can be repeated several times, either of the cam or hammer, as the operator

may choose. The model of a machine for making bullets or shot, by Dr. Bruff, is shown me, and I have examined it and the drawing marked by the commissioner. I find the principle of reducing the material to a certain form by the compression of converging surfaces to be the same as in the patent of Mr. Burden; I consider the semblance so near that, if it were required to form puddlers' spheres instead of cylinders, they would be indentical. The difference is only in the form of the peripheries of the cylinder, and the concave in the direction of its axis. This is only a difference of form and not of principle.

JOSEPH NASON.

Circuit court of the United States, for the northern district of New York.

ERASTUS CORNING AND JOHN F. WINSLOW ads. PETER A. BURDEN.

DISTRICT OF MASSACHUSETTS,
City of Boston, September 5th, 1849.

Henry Brevoort: I reside in East Boston; am an iron master by occupation; am acquainted with the puddling of iron, &c. I have examined a certified copy of the patent and drawings of Mr. Burden's machine for rolling puddlers' balls. I have had in operation one of his machines; it was similar to this model, marked C. L. W. I., now before me. This model and the machine I used differ from that described in Burden's patent, in its being horizontal instead of vertical, and the device for the purpose of upsetting the end of the mass being not described in the patent; the patent forms the upsetting by flanges of the trough, while in this machine it is formed by a flange on the cylinder, and a moveable plate above the cylinder. I used the machine I speak of for two years, at times; the machine did not operate to my satisfaction; it arose from an error of construction; it has been altered since then; I abandoned the use of mine because of this defect; I have seen others on the same principle as this model, which I think have performed satisfactorily.

I have examined the model of Mr. Winslow's machine, and understand its operation; the main point of difference is that the ball lies in one point, and is operated on by three points or surfaces attacking it at one time, and always revolving, instead of being operated on by one revolving surface against a fixed surface. The upsetting power is also different; I regard the revolving cylinders the great difference, which is decidedly an improvement; I regard this as an essential difference. The machines have in common an operation decidedly similar, except that the upper vertical eccentric operates against rollers instead of a fixed surface; the similar principle I regard to be compression by means of converging surfaces; that is the main point.

This model of a shot or ball machine, and these drawings marked by the commissioner, (exhibit attached to Lester's deposition,) now shown to me as the model and drawings of Dr. Bruff's machine, I have examined; they show a decided similarity to Burden's patent; I find in Bruff's the similarity I have found between Burden's and Winslow's is the principle of compression by converging surfaces; there the comparison ceases. Bruff's has no upsetting apparatus, and does not require any such, as in the model. (C. L. W. I.)

HENRY BREVOORT.

Circuit court of the United States, for the northern district of New York.

ERASTUS CORNING AND JOHN F. WINSLOW ads. PETER A. BURDEN.

DISTRICT OF MASSACHUSETTS,
Fall River, September 9th, 1849.

Philip D. Borden.—I am engaged in the iron business as superintendent of the Fall River iron works, engaged in rolling and nail manufacturing; we are also engaged in puddling iron; have five double and one single puddling furnaces. I have examined a certified copy of the patent of December 10th, 1840, granted to Henry Burden, and the drawings annexed; it describes a compressing machine where the flanges on each side are permanently attached to the concave trough, and the ball of iron must be dragged by the cylinder with great friction through the trough; it is not adapted to the various sizes of puddle balls; if the mass of iron is too large, it must either break the machine, or stop it, or the ball must come out in pieces; one of these results must take place; if the mass of iron was too small for the machine, it would not upset the ends at all. The principle of this machine is, that the ball is rolled between a cylinder and a concave, which gradually approach and converge as the ball progresses round; the tendency of this machine is to tear the ball in pieces rather than to condense it into a solid mass.

The model marked (C. L. W. I.) is now before me; I have examined it, and find that it differs from the patent machine of Henry Burden in several respects; the principle of reducing the iron between the cylinder and the concave is the same, but the concave differs from the patent inasmuch as there are no flanges on the concave; the lower flange of this model is attached to the cylinder and revolves with it, and instead of the top flange is an independent plate, which is free to slide on the shaft of the cylinder, and adapt itself to the various lengths of the bloom; this forms the upset and does away with the friction and drag of the ends of the bloom where the flanges are attached to the side of the concave.

The model of Mr. Winslow's machine for rolling puddlers' balls is before me, and I have examined the same; in this machine the iron is

operated on by two cylinders and a snail cam; the iron remains in the same position and turns on its own axis; it is operated on by the two cylinders and the snail cam; I consider these three elements all acting on the iron to condense it; whereas in C. L. W. I. model the cylinder has a tendency to flatten or break the iron against the concave or stationary trough, rather than to condense it; the machine of Mr. Winslow, by its arrangement, retains the ball in the same position, and enables the upset to be effected by means of a hammer or ram; I regard a blow of a hammer as a far preferable mode of making the upset to compression by the resistance afforded by the weight of the plate or by the assistance of stationary flanges; it is not practicable to apply a hammer for upsetting to the machine described in Mr. Burden's patent, or to the machine indicated by model C. L. W. I.; in Mr. Winslow's machine you can upset the bloom as much as the operator pleases until the operation is perfected, the cam always rolling the ball down to the required diameter, and presenting it to the hammer in unvaried diameter; in the Burden patent, or in model C. L. W. I., no advantage can be derived by continuing the operation after one revolution of its machinery.

I regard the machine of Mr. Winslow and the patent of Mr. Burden to be the same, so far as reducing the iron is concerned; that is, they are both intended to produce the same results, but the mechanical principles by which the result is effected are entirely different.

An iron model of a machine for rolling shot or balls is now before me, said to be invented by Dr. Bruff; in examining this model I find the same principles as in Mr. Burden's patent; the cylinder and the concave or shell are exactly the same in principle of reducing by compression; I should suppose it would not require the exercise of the inventive faculty to change this machine into that of Mr. Burden; it merely requires a change of the form of surfaces to adapt it to different uses; in rolling iron we constantly change the form of the surface of the rolls for producing different kinds of iron, and consider it a matter of adaptation, not of invention.

I have used a machine in our works similar to the model, (C. L. W. I.) for about a year and a half, at intervals; we bought the right to construct it of Mr. Burden about five years ago, and stopped using it about three and a half years ago; in operation the ball travels about fifteen feet; I have seen the iron ball thrown into the machine, pass part of the way through between the cylinder and the trough, and there stick, the cylinder as it rotated smoothing and grinding the iron, and revolving without moving the iron along; we took the machine sufficiently apart to take out the lump; there was no other way of taking it out; I have had this happen a number of times; this machine is still lying at our works in that condition, with a lump fastened in it, and has lain so for three years or more; we have abandoned the use of the machine, not deeming it worth fitting up again; such a difficulty could not occur in the Winslow machine.

PHILIP D. BORDEN.

The counsel for the defendant then called a witness, William E. Hibbard, who, being sworn, testified as follows:

I reside in Boston; my present business is that of a mechanical engineer; my principal business is that of superintending the construction of machinery; I was brought up a machinist and mill wright; I have studied the science of mechanics as applied to the arts; I have been draughtsman in a large machinery establishment at Boston; the process of puddling iron commences from the pig with melting or nearly melting it; it is melted in a reverberating furnace, in which the flame strikes the roof of the furnace and then bounds back on to the iron; the action of the flame on the iron expels the excess of carbon that is in the iron; pig iron is a carbonate of iron, an union of iron and carbon with other impurities; in the process of puddling the iron, if melted, bubbles; if not entirely melted, it ferments and the carbon escapes in a blue flame; when the iron gets to be malleable or has tenacity, it is gathered into the form of balls by the puddler; during the process the iron is stirred so as to be thoroughly converted and have all parts of it subjected to the process. The next branch is forming the bloom from the ball, which consists in consolidating the mass in some way, in divesting it of its porous character, and in that way expelling the cinder and in pressing together the particles; the cinder is a vitrified mass; a large portion of it is silex and oxide of iron; its character depends on the ore and is not uniform; any thing which will condense the particles so as to weld them before they lose their heat, may be used to condense the the iron; I consider a process to be a method of proceeding to arrive at some certain result, and it generally consists of several steps; the process of manufacturing iron is made up of a number of minor processes, such as puddling, shingling, and rolling, to arrive at a definite result. In this case I call shingling a process. The process consists in taking the loose mass, and compressing and condensing into bloom; and the greater or less the amount of condensation, and the more or less perfectly the bloom is condensed, the more or less perfect is the process. The end to which the process tends is the solidification of the bloom. There are many machines used for carrying into effect that part of the process which I call shingling. In my opinion the process is the same in all these machines. For the purposes of condensation, percussion acts in a very short time, and with great intensity during its action. I use the term great in reference to the amount of matter employed. Pressure is merely a direct force applied to the surface with more or less rapidity, according to the constitution of the machine that applies the pressure. These two mechanical actions, percussion and pressure, are both of them employed, and are well known mechanical actions for compressing metals and driving out their impurities. The same kind of pressure that condenses cotton would be applicable to the expressing of oil from seeds. The expression of a liquid substance from a solid, as juice from an orange, is a necessary consequence of pressure. I consider it very difficult to give a perfect definition unless we use terms correctly.

Question by the court. Would it not be sufficiently exact to say that the process resorted to by the plaintiff is the rolling the mass between converging surfaces?

Answer. If the mode of operation of the machine imparted some distinctive character to the mass operated on, which it does not and cannot receive from any other source, then the character and the mode of operation would blend, and the mode of operation would become a part of the process.

By distinctive character I mean a distinctive property aside from form, unless where form is the end to be accomplished. Where the end is to reduce the body to a given form, there the form may be a property of the body. Two machines may have different modes of operation and produce the same result, and both carry out the same process. The mode of procedure to obtain the result in spinning by hand and spinning by power is different, but the result is the same, and so far as the process goes, without any reference to the machinery, the process is the same. I have read the specification of Burden's patent.

The counsel for the defendants then proposed to ask the said witness the following question:

Do you consider the invention of Mr. Burden, as set forth in his specification, to be for a process or for a machine?

But the counsel for the plaintiff then and there objected to the putting of the said *said* question to the said witness, and the said judge did then and there declare and deliver his opinion, that the said objection so taken by the said counsel for the said plaintiff ought to be allowed, and that the said question ought not to be put to the said witness; and did, accordingly, decide that the same should not be put; to which said opinion and decision of the said judge the said counsel for the said defendants did then and there, on behalf of the said defendants, except, and the said question was not put to the said witness.

The said witness further testified as follows:

Question. Does the process of reducing a puddler's ball to a bloom, in Burden's machine, differ from the process formerly used in the alligator jaws and in the hammer?

Answer. So far as the process applies to the consolidation of the mass it does not differ. It does not differ unless Burden's machine imparts a distinctive character to the mass. Any form may be given to the mass under the hammer; only one can be given in Burden's machine. Under the alligator jaws the ball is frequently turned during the compression. Mr. Burden's bloom is a fluted cylinder, proximately cylindrical. I have examined Mr. Winslow's machine, and seen it in operation. So far as condensation of the mass in producing a bloom is concerned, the process of making a bloom in Winslow's machine does not differ from the process employed in the hammer and in the alligator jaws. But I think Winslow's machine gives a different constitution to the particles of iron as they

are worked into a bloom from that which was given by the old modes, which is due to the peculiar action exerted on the iron by Winslow's machine. I have made some experiments on this subject. I think that the result to which I refer as produced on the particles of iron by Winslow's machine would not be produced by Burden's. I think that difference is due entirely to the difference in the mechanical principles of the two machines. There is nothing that is found in common in Winslow's and Burden's machines, in the process resulting from the use of them, that is not found in the process as applied under the alligator jaws and the hammer.

The counsel for the defendants then offered to prove, by this witness, that the practical manner of giving effect to the principle embodied in the machine used by the defendants, was entirely different from the practical manner of giving effect to the principle embodied in Mr. Burden's machine; that the principles of the two machines, as well as the practical manner of carrying out those principles, were different; and that the machine used by the defendants produced, by its action on the iron, a different mechanical result on a different mechanical principle from that produced in Mr. Burden's machine. To the introduction of the said evidence so offered, the counsel for the plaintiff then and there objected, on the ground that the said evidence, so offered, was irrelevant. And the said judge did then and there declare and deliver his opinion that the said objection, so taken by the said counsel for the said plaintiff, ought to be allowed, and that the said evidence, so offered, ought not to be admitted; and did, accordingly, decide that the said evidence, so offered, should not be admitted; to which said opinion and decision of the said judge the said counsel for the said defendants did then and there, on behalf of the said defendants, except, and the said evidence, so offered, was not admitted.

Question. You have stated that Mr. Winslow's machine imparts distinctive characteristics to the bloom that are not imparted to it by Mr. Burden's machine; will you explain wherein and why that is?

Answer. I meant this: before my attention was called to these machines I had my attention called to an article on Nasmyth's die block, in relation to compacting or compressing iron between three surfaces; it was called a swedge or a V die block for hammering iron; when my attention was called to this I thought I would try the experiment of compressing some plastic substance between three surfaces; I also made a rough model to try some experiments by compression between two surfaces; I experimented with putty; I formed the ball of putty into a cylinder, and stamped the end of it with a series of concentric cylinders, in order to observe the action of the particles under the compression; by rolling the cylinder between two surfaces, I found that the end was ruptured, showing that there was much more compression at the surface of the cylinder than at the centre; by compressing the cylinder between three surfaces, I found that a round end was made, showing that the compression was through to the centre, and not on the surface; un-

der the action of two surfaces the ball is a flattened cylinder and can have no axis, and in the rolling there is a tendency to tear away the top part; the three surfaces compress more intensely at the centre than at the surface; the next machine to which the bloom is subjected after it is made is the roll, where it is drawn into a bar; in the roll the tendency is to pull the bloom into two parts endwise, and it requires to be thoroughly welded in order to resist the action of the roll; in Winslow's machine the practice is to make the cam revolve twice; after the cam has passed around once, and in the interval before it comes around again, the hammer is acting and making a firm longitudinal weld, so that the bloom will the better resist the subsequent drawing by the rolls; the action of Winslow's cam the second time it comes around is full as beneficial as it was during its first operation, if not more so; I think that this action by three surfaces in Winslow's machine constitutes a substantial difference between it and Burden's in the process carried on in the two machines; the difference between the blooms produced by the two machines is owing to the different manner in which the mechanical forces are applied in them; in Burden's machine, where two surfaces act on the ball, the mass assumes the shape of a flattened cylinder; while in Winslow's the compression is towards the centre in the shape of a triangle.

Process is a mode of procedure towards some definite result; in Winslow's machine a different result from that of Burden's is obtained, and that cannot be done without a new process; the new process is due to the different manner in which the forces are applied to the spongy mass in Winslow's machine, from that in which they are applied in Burden's; both machines agree in reducing puddle balls to blooms; I can not state from my personal knowledge that the hammer makes better blooms than Mr. Burden's machine does; but from my knowledge of the use of the hammer I infer that the intrinsic qualities of the iron produced by the hammer would be superior to those of that produced by Mr. Burden's machine.

(The model of the Bruff machine for rolling shot or bullets, testified to by Mr. Lester in his deposition, was here shown to this witness. This model and any other model referred to in this bill of exceptions may be produced and used by either party on any argument to be had on this bill of exceptions.)

I think the action of this bullet machine of Bruff's on the metal, is precisely analogous to the action of Mr. Burden's machine in its method of rolling balls, because the action on the metal in Bruff's machine conforms to the theory laid down in the patent of Mr. Burden, and because in Bruff's the metal is rolled between two converging surfaces, having one or both of them a progressive motion, and rolling the metal over and over as it is pressed; I think the tendency in Bruff's to compact or compress the metal is precisely analogous to the tendency in Burden's, the only difference being in the quantity of compression, which is due to the greater or less convergence of the surfaces; that is a matter of judgment and not of invention; Bruff's was a machine to

condense as well as to form the metal; the qualities desired in a musket ball are to have it dense; all good musket balls are made by compression; when they are cast the lower side of them is heavier than the upper side, because the denser particles of the fused metal sink, and thus the ball is not of equal density throughout; the Government uses altogether now musket balls made by compression; in my opinion compression will condense a piece of lead that has been cast; I have no doubt of it; if this machine of Bruff's were made strong enough it would roll bullets of heated iron, if the iron was made hot enough to be plastic, and sufficiently dense to be carried around and pass through the machine; Bruff's machine would roll a puddle ball into a sphere, if it were made large enough to do so, with the same proportions which it now has; if I desired to roll a cylinder in Bruff's machine, I would form the surfaces of the cylinder and of the concave so as to have them roll a cylinder; in rolling iron it is a common practice to vary the surfaces of the rolls according to the shapes you desire to roll, as if you want to roll a round bar you give a semi-circular form to the grooves in the roll.

I have seen the machines at the mint for milling coin; the edges of the planchet of metal require to be thickened and the planchet to be reduced in diameter; in the mint machines, testified to by Mr. Peale, the metal was rolled between converging surfaces, that is, surfaces standing at an angle; in the mint machines the surfaces for one entire revolution of the planchet, at the end before it comes out, are parallel so as to leave it a circle, but up to that point the surfaces are converging so as to reduce the diameter; there are grooves with bevelled sides to receive the coin; the convergence is made by the groove being deeper at one end than at the other, and I think that the convergence is only on one side of the machine; I think the mint machines and Burden's act on the same mechanical principles; the operation of the two machines on the metal I conceive to be the same; in Bruff's machine there was a mode of adjusting the concave.

Question. By changing the form of the rolling surfaces in Mr. Burden's machine, can it be made to roll a sphere?

Answer. It can, by making the form of the surfaces assume a semi-circular contour.

The counsel for the defendants then proposed to ask the said witness the following question:

By changing the form of the rolling surfaces in Mr. Winslow's machine, can it be made to roll a sphere?

But the counsel for the plaintiff then and there objected to the putting of the said question to the said witness, on the ground that it was irrelevant and immaterial to any issue in the action; and the said judge did then and there declare and deliver his opinion that the said objection so taken by the said counsel for the said plaintiff aforesaid ought to be allowed, and that the said question ought not to be put to the said witness, and did accordingly decide that the same should not be put; to which said opinion and decision of the said judge the said coun-

sel for the said defendants did then and there, on behalf of the said defendants, except, and the said question was not put to the said witness.

On being cross examined the said William C. Hibbard testified as follows:

The means by which a result is obtained is the machine; the mode of operation by which it is obtained is the process.

Question. Do you understand process as meaning any thing but method, proceeding, operation?

Answer. Not in the abstract. Process in mechanics certainly has a different meaning from that which it has with lexicographers. It has a definite or specific meaning—a limited meaning—as applied to mechanics.

Question. Does process mean any thing else in mechanics but proceeding, method, operation?

Answer. It means method. That word has a meaning similar to the word process, when the method is spoken of as applied to produce any thing in mechanics. Process is method, applied to something to produce a certain end. A machine may be in operation and produce nothing, or it may produce something. The method of its operation on a definite body is a process. You can not show the operation of a machine, unless there is something in it to be operated on; but you can show its action. In manufacturing glass, some is blown and some is pressed; the process in the two operations is not the same. Water may be decomposed by electricity, and by chemical operation; the process in the two modes is not the same, speaking of it as a process of manufacture. I think that the process of letting water evaporate from a sponge, and the process of squeezing it out, are not the same process. I think the process of tanning by alum, and that of tanning by bark, are distinctly different; more so than spinning by hand and spinning by power. I think the process of turning a grindstone by hand, and turning it by machinery, are the same; the mechanical operation is the same. Process is not the proper term to apply; the method of turning it is not the same. A man turning a grindstone by hand is not a process; it is a mode of operation, a method of turning the grindstone. You must take all the words together to express the meaning; the result obtained is turning the grindstone. In the machines of Burden and Winslow, the formation of the bloom is the result of the process; in producing the bloom, the process is the method by which that result is obtained. Method generally applies to the operation of a machine; process may include a number of methods. According to the experiments I made with the putty, the ends of the blooms made in the Saugerties machine ought, if they were not upset, and if the blooms were made under the same conditions under which my experiments took place, to have been trumpet-mouthed and not oval. In the experiment I made with three surfaces, the centre of the end projected beyond the edges of the circle. If the hammer had acted on it, this would not have been so. I am not practically acquainted with converting puddlers' balls into blooms. The object of making a bloom, is not to apply it to any use in that state as a manufacture. It is de-

sirable not to have fag ends in the bloom, and to have the ends solid and not ragged. It is disadvantageous, in the manufacture of iron, to have blooms made out of balls that are not properly puddled. I have no positive knowledge as to the difference of solidity between the blooms made in Burden's machine and those made in Winslow's.

I think that the milling machines at the mint thicken up the edge of the coin about one-eighth of an inch. The object of thickening up the edge is to make it stand the subsequent stamping; the object is to accumulate a mass of metal around the edge, to be forced out in the subsequent process of stamping. I saw the machines at the mint at Philadelphia, in October, 1849, a day or two before the date of Mr. Peale's deposition; I was present when Mr. Peale made his deposition; the commissioner also was present; no other person that I knew was present. I examined Mr. Peale—all the examination that there was. I proposed to him a series of questions that were written down; I made the drawings that are appended to his deposition. I can not say whether I saw any one of the machines in operation; there were six. I speak of the distance that the planchets were compressed in from the edge, from having seen them after they were milled.

Winslow's machine converts puddlers' balls into blooms; it does so, by causing the ball to roll on its own axis between converging surfaces, as a general proposition. These surfaces cause the ball to revolve on its own axis. If a new and different result, not analogous to a former result, is produced, I think that is evidence that it is produced by a new process.

I have examined no witness in this case but Mr. Peale; the commissioner wrote Mr. Peale's deposition from his dictation.

I think that the result of converting a puddler's ball into a bloom, is different from the result of making a bullet in Bruff's machine, or milling a coin, because one makes a bloom and the others make a bullet, or a planchet, but I consider the results as analogous. One analogy between a bloom and a bullet is, that they are both metallic; another analogy is, that they are both circular in the direction of their rotation; a third analogy is, that they are both condensed by pressure. The analogies between a half dollar, when milled, are, that they are both cylindrical—the one being a short cylinder and the other a long one—in the direction in which they are acted on by the machines which produce them; that they are both rolled into cylinders, the coin being made into a cylinder of smaller diameter than it was when it was put in; and that they are both condensed by simultaneous pressure between two converging surfaces. Ploughing and spading are analogous, so far as regards turning up the earth, but not as regards the mode of operation.

On being again examined by the counsel for the defendants, the said William C. Hibbard testified as follows:

I was employed by Mr. Winslow, in the course of my business, to make drawings of several machines for him, and, among others, of the mint machines. His counsel being unable to attend to the examina-

tion of Mr. Peale, I was furnished with a series of interrogatories by one of his counsel, to be propounded to Mr. Peale.

It would be better to have a badly puddled ball manufactured into a bloom, and have the impurities expressed, than to have it broken up in making it. If a machine has a tendency to break a badly puddled ball, it would have a tendency to disintegrate a well puddled ball.

The counsel for the defendants then offered to prove by this witness that the machine used by the defendants differed in point of mechanical construction and mechanical action from the machines described in Mr. Burden's specification. To the introduction of the said evidence, so offered, the counsel for the plaintiff then and there objected, on the ground that the said evidence so offered was irrelevant; and the said judge did then and there declare and deliver his opinion, that the said objection so taken by the said counsel for the said plaintiff ought to be allowed, and that the said evidence so offered ought not to be admitted, and did accordingly decide that the said evidence so offered should not be admitted; to which said opinion and decision of the said judge the said counsel for the said defendants did then and there, in behalf of the said defendants, except, and the said evidence so offered was not admitted.

These two models represent, substantially, the machine used by the defendants in the parts acting on the bloom.

I think that a spherical ball, rolled into a cylinder between two surfaces, ought not to have a trumpet-mouthed shape to the ends when rolled. The experiment I made with the putty was to show the direction and intensity of the forces acting on the substance, and the motion of the particles during the process of compression. If the ball was at first rolled into the shape of a sphere, and was then elongated, it would have rounded ends; they would be smooth, but that would not necessarily show that the bloom was sound.

The counsel for the defendants then called as a witness Enoch Robinson, who, being sworn, testified as follows:

I reside at Raynham, in Massachusetts; my profession is the making of iron in all its stages. I am an iron master and owner of iron works; I have been constantly engaged in the business since I was 15 years old; I am now 42. We have upwards of 300 men employed in our establishment, most of the time 350. We work seven puddling furnaces constantly. I am acquainted with Mr. Burden's machine for rolling puddle balls; I have used one; I used it something over two years; it was a horizontal machine; the diameter of the cylinder was somewhere about $4\frac{1}{2}$ feet; it did not work to my satisfaction. In the fall of 1843 we took it out, wanting the room for better purposes; it was so irregular in forming the blooms, that we could not use it for our purposes; one ball would be too large, and would not go through the machine, and another would be too small, and the cinder would not be excluded; there was no certainty that the blooms would come out without difficulty. One difficulty we had was in putting in the ball; sometimes the cylinder would take off parts of the ball, and they would fall in the shape of scrap iron; it was not an uncommon thing for the

balls to split into two parts, and remain in the machine, or come out in two imperfect blooms imperfectly squeezed. One great objection we had to the machine was that the balls were not generally upset; I found that the blooms made in the machine were inferior to those made under the hammer. We make nails; I think that the making of nails is full as good a test of iron as the making of wire, because wire will bend, where the square edge of a nail will not bend but will break off. We make nails as extensively as any establishment in the United States; we made last year 190,000 kegs. Our main "aim" is to make iron of good quality. The expense of changing a puddle ball into a bloom with the hammer, costs us not exceeding from 40 to 50 cents per ton; that is called shingling. We found it was better for us to pay for the shingling, than to put the balls through Mr. Burden's squeezer. We changed back to the hammer on account of the loss of iron by the squeezer, and of the balls being caught in the machine, and our having to stop the furnaces while they were being got out; we used to get from the machine from 1500 to 2500 pounds of broken balls per week, that were not worth half price; we moved the machine out of doors, and afterwards broke it up; we had paid for the privilege of using the patent right. In order to make good iron the puddling should be well performed; the evil can never be remedied after the iron leaves that stage; I say that from experience. Iron that is tender in the ball state will always make brittle iron, both under the hammer and under the squeezer; but it will make better iron under the hammer. I have seen the poorest class of iron puddled and pass through the machine; it can be done, if the puddler knows how to handle the iron to suit the machine. A puddler can cheat just as well under the machine as under the hammer. I think that Burden's machine has no advantage over the hammer in preventing the puddler from cheating; if the iron is tender the puddler will, if he wants to cheat Burden's machine, ball the iron close, and be careful not to let it heat too much, and will "let it" soak after it is balled up.

I have worked lead some; we use it for our purposes for polishing rolls. I consider hot iron, at a welding heat, and cold lead, as just about the same thing in respect to their being drawn in length and in width. There is not much difference in the power and draught of a machine for rolling cold lead, and one for rolling iron at a welding heat; I make no difference between the rolls for rolling sheet lead and those for rolling sheet iron. We use the same machinery to roll cold lead that we do to roll iron bars; the machine of Burden's that I had would roll cold lead into a bloom. That operation would most assuredly condense and elongate it; I see no difference in rolling between the treatment of cold lead and the treatment of hot iron. I have seen the machine which Mr. Winslow uses for rolling puddle balls.

On being cross examined, the said Enoch Robinson testified as follows:

The firm to which I belong is called the Old Colony Iron Works, and goes under the name of Crooker & Co. We set up Mr. Burden's

machine in April, 1841; I recollect seeing directions sent by Mr. Burden in March, 1841, giving us a description how to set it up. I think it was set up in April, 1841; I had never seen a horizontal machine of that kind operate before. I saw Burden's vertical machine in his mill; he called it worthless; he said it did not work well, and that he was going to make a better one. He said he was making the patterns for one. It was some time in the winter of 1840–41, that I was at Burden's works and had this conversation.

I have been a hammers-man in the iron business in different respects. I made shafts and anchors; and I then changed my business to shingling and puddling scrap iron. I worked for three years in succession at shingling. I worked at shingling at Bridgewater, Massachusetts. That is where I served my time. I have 2 brothers in the iron business; one of them is with me. My brother, who is at Weymouth, Massachusetts, was a shingler. He was brought up at shingling of all kinds. He worked at the establishment at Raynham for 7 years before we got this machine. My other brother is one of the acting agents of our concern. It takes 2 persons to attend a hammer, a shingler and a helper or puller off. We pay all our men by the day, except the puddlers. We pay the shinglers $2 per day, as a general thing. We have paid $2.25 per day; and, in one instance, I believe we paid $2.50 per day. The highest we pay now is $2.25 per day. We pay the helper $1 per day. One hammer does the work from 7 furnaces. It makes about 8 tons of iron in 12 hours, one week with another. My hammer is driven by water. It has a wooden shaft. It will weigh from 1200 to 1400 lbs. We do not require a third man to attend the water gate. The helper does that. There was a gentleman named Richmond, now dead, who formed a part of our former concern. He belonged to the works when Burden's machine was there. I believe he did the contracting for the machine with Mr. Burden. I was not opposed to getting the machine. It was through me we got it, because we had no hammer at that time. We wanted something, and this machine was recommended, and so we got it and tried it. I know of no way to make blooms that is so good as the hammer. I doubt whether there is any. My hammer is better than the English helve hammer. I saw Burden's machine in operation at his place last fall. I have seen it work at Fall River also. It was rolling blooms when I saw it at Mr. Burden's works. I saw 2 or 3 blooms go through it. I suppose it was regularly at work then. The heat came on while I was there. I think Mr. Brownell was with me. I saw the same difficulty in the working of that machine, compared with the hammer, that I did in mine. I did not see any balls break while I was there. We use up about 2 or 2½ lbs. of staff to each ball. I stood 20 or 30 feet from Burden's machine when I saw it at his works last fall. I went up there then with Mr. Simon Borden and Mr. Brownell. The plaintiff went in with me. I think Mr. Philip D. Borden was with us. I knew the plaintiff objected to our going in, and Mr. Philip D. Borden said we would not go in; and afterwards the plaintiff persuaded the

rest of us to go in. I cannot say whether Mr. Crooker went up with us. Mr. Winslow did not request us to go there. I fell in company with those gentlemen at the hotel in Albany. I was called there as a witness on this case. I cannot say whether Mr. Odiorne was with us at that time. I suppose I could use one of Burden's machines now if I wanted to, but I prefer the hammer. It is good enough for me.

The said judge here announced that he should charge the jury in this case in manner as is hereinafter set forth; whereupon the counsel for the said defendants announced that, on that intimation, they should offer no more evidence on the part of the defendants.

And the said judge did also then and there further declare and deliver his opinion to the said jury, as follows:

1. The letters patent to Henry Burden, which have been given in evidence by the plaintiff, are for a new process, mode, or method of converting puddlers' balls into blooms, by continuous pressure and rotation of the ball between converging surfaces; thereby dispensing with the hammer, alligator jaws, and rollers accompanied with manual labor, previously in use to accomplish the same purpose. And the said letters patent secure to the patentee the exclusive right to construct, use, and vend any machine adapted to accomplish the objects of his invention as above specified, by the process, mode, or method above mentioned.

To which opinion of the said judge the said counsel for the said defendants did then and there, on behalf of the said defendants, except.

And the said judge did also then and there further declare and deliver his opinion to the said jury, as follows:

2. The machines for milling buttons, milling coin, and rolling shot, which have been given in evidence by the defendants, do not show a want of novelty in the invention of the said patentee as already described, if the processes used in them, the purposes for which they were used, and the objects accomplished by them, were substantially different from those of the said letters patent.

To which opinion of the said judge the said counsel for the said defendants did then and there, on behalf of the said defendants, except.

And the said judge did also then and there further declare and deliver his opinion to the said jury, as follows:

3. That the machine used by the defendants is an infringement of the said letters patent, if it converts puddlers' balls into blooms by the continuous pressure and rotation of the balls between converging surfaces, although its mechanical construction and action may be different from those of the machines described in the said letters patent.

To which opinion of the said judge the said counsel for the said defendants did then and there, on behalf of the said defendants, except.

And the said judge, under the charge and with the directions aforesaid, left the aforesaid issue, and the evidence so given on the trial thereof as aforesaid, to the said jury; and the jury aforesaid then and there gave their verdict for the said plaintiff for one hundred dollars damages.

And inasmuch as none of the said several matters so produced and given in evidence on the part of the said defendants, and so by their counsel aforesaid objected and insisted on as a bar to the action aforesaid, and none of the said exceptions so offered and made to the opinions and decisions of the said judge do appear by the record of the verdict aforesaid, the said counsel for the said defendants did then and there propose their aforesaid exceptions to the said several opinions and decisions of the said judge, and requested him to put his seal to this bill of exceptions, containing the said several matters and exceptions, according to the form of the statute in such case made and provided; and thereupon the said judge, at the request of the said counsel for the said defendants, did put his seal to this bill of exceptions, pursuant to the statute in such case made and provided, this fifth day of July, in the year of our Lord 1850.

A. CONKLING. [L. S.]

At an adjourned session of the circuit court of the United States, held in and for the northern district of New York, in the second circuit, at the City Hall in the city of Albany, on the 29th day of January, A. D. 1852. Present, honorable Alfred Conkling, a judge of said court.

PETER A. BURDEN
vs.
ERASTUS CORNING and John F. Winslow.

On motion of Mr. T. Stevens, of counsel for plaintiff, ordered, that the motion for a new trial in this cause on the part of the defendants be, and the same is hereby, denied; and that the defendants be permitted to bring a writ of error on the bill of exceptions taken at the trial on condition that they reform the same by substituting the word "if" in place of the word "because" in the second instruction given by the court to the jury, as the same now appears on the 86th page of the printed copy of the said bill.

Pleas before the judges of the circuit court of the United States, for the northern district of New York, at the City Hall in the city of Albany, of the term of October, in the year 1849.

Witness Roger B. Taney, chief justice of the Supreme Court of the United States.

AUGUSTUS A. BOYCE, *Clerk, &c.*

NORTHERN DISTRICT OF NEW YORK, *to wit:*

Be it remembered, that on the 8th day of February, 1849, came Peter Burden, by Samuel Stevens, his attorney, into the circuit court of the United States, for the northern district of New York, before the judges thereof, and impleaded Erastus Corning and John F. Winslow on a certain plea of trespass on the case in which the said plaintiff declared against the defendants in these words:

NORTHERN DISTRICT OF NEW YORK, *ss.*

Peter A. Burden, a citizen of the United States, plaintiff in this suit, by Samuel Stephens, his attorney, commences this his action against Erastus Corning and John F. Winslow, defendants in said suit, by filing this his declaration in the office of the clerk of this court according to the rules of the court, and complains of the said defendants of a plea of trespass on the case.

For that whereas Henry Burden, a citizen of the United States before and at the time of the granting of the letters patent as hereinafter set forth, was the original and first inventor and discoverer of a new and useful machine for rolling puddle balls or other masses of iron in the manufacture of iron, to wit, at the city of Troy, and within the district aforesaid; and thereupon heretofore, to wit, on the 10th day of December, in the year 1840, at the city of Washington, upon the application of the said Henry Burden in due form of law to the Commissioner of Patents, letters patent were duly issued in the name of the United States of America in due form of law, under the seal of the Patent office of the said United States, signed by John Forsyth, secretary of State, and countersigned by Henry L. Ellsworth, commissioner of patents, bearing date the day and year last aforesaid, and were duly delivered to the said Henry Burden; which said letters patent and the specifications thereto annexed, and forming a part thereof, the plaintiff brings here into court; wherein and whereby was granted to the said Henry Burden, his heirs, administrators, and assigns, for the term of 14 years from and after the date of the said patent, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said machine, as by the said letters patent in court to be produced will fully appear.

And the said Henry Burden afterwards, to wit, on the 10th day of November, 1848, at the city of Troy and within the northern district aforesaid, by a certain deed of assignment then and there made by the said Henry Burden to the said plaintiff, which said deed, sealed with the seal of the said Henry Burden, the said plaintiff now brings here into court for the consideration therein mentioned, did assign, transfer, sell, and let over, unto the said plaintiff, all the right, title, interest, and benefit granted and secured to him, the said Henry Burden, by said letters patent; which said deed, afterwards, to wit, in the month of January, 1849, was duly recorded in the Patent office at the city of Washington, as by reference to the said deed of assignment and the certificate of the recording thereof thereon endorsed will fully appear.

And the said plaintiff further says, that the said exclusive right, so as aforesaid secured to the said Henry Burden by the said letters patent, and assigned by the said Henry Burden to the said plaintiff as aforesaid, has been possessed and used by him, the said plaintiff, since the said assignment, and is of great value to him, the said plaintiff, to wit, of the value of fifty thousand dollars.

Yet the said defendants, well knowing the premises, but contriving and wrongfully intending to injure the said plaintiff, and to deprive him

of the profits, benefits, and advantages which he might, and otherwise would, have acquired and derived from the said exclusive right of making, using, and vending to others the right of using, the said machine described in said letters patent, and therein and thereby granted and secured as aforesaid, did, after the making of said letters patent, and the execution of the assignment aforesaid, and during the said term of time in the said letters patent mentioned, to wit, on the 10th day of November, 1848, and on divers other days and times, and every day between that day and the commencement of this suit, to wit, at the city of Troy, in the State of New York, and in the northern district aforesaid, make, construct, and use, and caused to be made, constructed, and used, and did vend, and caused to be vended to others to be used, the said new and useful machine, and a machine and machines embracing and including the principles of the said new and useful machine, so as aforesaid invented by the said Henry Burden, and so as aforesaid secured to him by said letters patent, in violation and infringement of the exclusive right so secured to the said plaintiff by said letters patent, and the assignment aforesaid, and contrary to the form of the statutes of the United States in such case made and provided.

And also that whereas the said Henry Burden, before and at the time of the granting the said letters patent, and the committing the grievances hereinafter in this count mentioned, was the original and first inventor and discoverer of a certain other new and useful machine for rolling puddle balls, or other masses of iron, in the manufacture of iron, to wit, at the city of Troy, and within the northern district aforesaid; and thereupon, heretofore, to wit, on the 10th day of December, 1840, at the city of Washington, upon the application of the said Henry Burden, in due form of law, to the Commissioner of Patents, letters patent were duly issued in the name of the United States of America, in due form of law, under the seal of the Patent office of the said United States, signed by John Forsyth, secretary of State, and countersigned by Henry L. Ellsworth, commissioner of patents, bearing date the day and year last aforesaid, and were duly delivered to the said Henry Burden; which said letters patent, and the specification thereto annexed, and forming a part thereof, the plaintiff brings here into court, wherein and whereby was granted to the said Henry Burden, his heirs, administrators, or assigns, for the term of 14 years, from and after the date of the said patent, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used, the said machine, as by the said letters patent in court to be produced will fully appear.

And the said Henry Burden afterwards, to wit, on the 10th day of November, 1848, at the city of Troy, and within the northern district aforesaid, by a certain deed of assignment then and there made by the said Henry Burden to the said plaintiff, which said deed, sealed with the seal of the said Henry Burden, the said plaintiff here brings into court, for the consideration therein mentioned did assign, transfer, sell, and let over unto the said plaintiff, all the right, title, interest, and

benefit granted and secured to him, the said Henry Burden, by said letters patent; which said deed afterwards, to wit, in the month of January, 1849, was duly recorded in the Patent office at the city of Washington, as by reference to the said deed of assignment, and the certificate of the recording thereof thereon endorsed, will fully appear.

And the said Henry Burden afterwards, to wit, on the 2d day of February, 1849, at the city of Troy, and within the northern district aforesaid, by a certain deed then and there made by the said Henry Burden to the said plaintiff, which said deed, sealed with the seal of the said Henry Burden, the said plaintiff now brings here into court, for the consideration therein mentioned did confirm the said grant, assignment, and conveyance, of the said 10th day of November, 1848, as aforesaid; and did also, by said last mentioned deed, grant, assign, and convey, to the said plaintiff, all the rights, privileges, immunities, and property granted and secured to him, the said Henry Burden, by said letters patent; which said last mentioned deed afterwards, to wit, in the said month of February, 1849, was duly recorded in the Patent office at the city of Washington, as by reference to the said deed, and the certificate of the recording thereof thereon endorsed, will fully appear.

And the said plaintiff further says, that the said exclusive right, so as aforesaid secured to the said Henry Burden by the said letters patent, and assigned by the said Henry Burden to the said plaintiff as aforesaid, has been possessed and used by him, the said plaintiff, since the said assignment, and is of great value to him, the said plaintiff, to wit, of the value of fifty thousand dollars.

Yet the said defendants, well knowing the premises, but contriving and wrongfully intending to injure the said plaintiff, and deprive him of the profits, benefits, and advantages which he might, and otherwise would, have acquired and derived from the said exclusive right of making, using, and vending to others the right of using, the said machine described in said letters patent, and therein and thereby granted and secured as aforesaid, did, after the making of said letters patent, and the execution of the assignment aforesaid, and during the said term of time in the said letters patent mentioned, to wit, on the 10th day of November, 1848, and on divers other days and times, and every day between that day and the commencement of this suit, to wit, at the city of Troy, in the State of New York, and in the northern district aforesaid, make, construct, and use, and caused to be made, constructed, and used, and did vend, and caused to be vended to others to be used, the said new and useful machine, and a machine and machines embracing and including the principles of the said new and useful machine, so as aforesaid invented by the said Henry Burden, and so as aforesaid secured to him by said letters patent, in violation and infringement of the exclusive right so secured to the said plaintiff by said letters patent, and the assignment aforesaid, and contrary to the form of the statute of the United States in such case made and provided; thereby, and by means of which grievances, the said plaintiff has been greatly injured, and de-

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prived of great gains, profits, and advantages which he might, and otherwise would, have derived from said invention, and the exclusive use thereof, to wit, at the city of Troy, in the State of New York, and northern district aforesaid, and has sustained actual damage to a large amount, to wit, to the amount of five thousand dollars. By means of which several premises, and by force of the statute aforesaid, an action has accrued to him, the said plaintiff, to recover the said actual damage, and such additional amount, not exceeding in the whole three times the amount of such actual damage, as the court may see fit to order and adjudge; yet the said defendants, although often requested to do so, have never paid the same, or any part thereof, to the said plaintiff, but have refused and still do refuse so to do, to the damage of the said plaintiff of fifteen thousand dollars, and therefore he brings suit, &c.

Plea.

And the said defendants, by David L. Seymour, their attorney, come and defend the wrong and injury, when, &c., and say that they are not, nor is either of them, guilty of the said suppose[d] grievances above laid to their charge, or any, or either, or any part thereof, in manner and form as the said plaintiff hath above thereof complained against them, and of this they put themselves upon the country, &c., and the said plaintiff doth the like, &c.

And the said defendants served, according to the statute in such cases made and provided, the following notices upon said plaintiff's attorney:

Sir: Be pleased to take notice that, on the trial of this action, the defendants will, under section 15 of the act of Congress, passed July 4th, 1836, entitled "An act to promote the progress of the useful arts, and to repeal all acts and parts of acts heretofore made for that purpose," give in evidence the following special matter, namely:

That the two several letters patent of the 10th of Dec., 1840, mentioned in the declaration herein, are one and the same letters patent. That Henry Burden was not the original and first inventor or discoverer of the supposed new and useful machine, for rolling puddle balls, or other masses of iron in the manufacture of iron, described in the letters patent in the said declaration mentioned and referred to, or of either of the supposed machines described in the said letters patent, and for which the same were granted, or of any part thereof.

That the said Henry Burden was not the original or first inventor, or discoverer of the invention, of preparing the puddlers' balls, as they are delivered from the puddling furnace, or other similar masses of iron, by causing them to pass between a revolving cylinder and a curved segmental trough adapted thereto, constructed and operating substantially in the manner of that described in the specification annexed to the said letters patent, and represented in figures 2 and 3 of the drawings accompanying said letters patent and specification; and that he was not the original or first inventor, or discoverer of the invention, of preparing the puddlers' balls, as they are delivered from the puddling furnace,

or other similar masses of iron, by causing them to pass between vibrating or reciprocating tables, surfaces, or plates of iron, in the manner exemplified in figure 1 in the drawings accompanying said specification; and that he was not the original or first inventor, or discoverer of the invention, of preparing puddlers' balls, as they are delivered from the puddling furnace, or other similar masses of iron, by causing to pass between vibrating or reciprocating curved surfaces, operating upon the principle and producing a like result by means analogous to those described in said specification.

That the said supposed invention and inventions, for which the said letters patent were granted to the said Henry Burden, was not, and were not, nor was either of them at the time of granting the said letters patent, a new invention or inventions; but that, on the contrary, the method of squeezing out the impurities, and of reducing or working puddlers' balls by rolling, had long prior to the date of the said Henry Burden's alleged invention and inventions, and long prior to the application of the said Henry Burden for his said letters patent, been known and used and practised by the use of machines which are and were called roughing rolls or rubbling rolls, which method and which machines were constructed upon the same principles, and embraced the supposed improvements and inventions for which the said letters patent were granted to the said Henry Burden, and were and are used for substantially the same purpose; and the same had been used in the year 1830 and 1831, at the city of New York, by Edward Dunscomb, and at his rolling mill at that place in the year 1838; at Troy, in the State of New York, by the defendants at their rolling mill in the immediate vicinity of the plaintiff's residence and his place of business, in the year 1835, 1836, and 1837; at Boston, in the State of Massachusetts, by the Boston Iron Company; and that the same were in common use and well known in the iron works, both in the United States and Great Britain, from the year 1820 to the year 1840.

And these defendants intend to prove, that such prior knowledge of the same was possessed by Charles M. Keller, of the city of New York; by Ralph Crocker, of Boston, Mass.; by John Snyder, of Troy, New York; by William V. Many and Addison Low, of Albany, New York; by George Odiorne, of Boston, Mass.; by Richard Borden, of Fall River, Mass.; by Stephen Chubback, of Wareham, Mass.; by John Simmons, of Saugerties, New York; by Philip Borden, of Fall River, Mass.; by Increase Robinson, of Wareham, Mass.; by Charles Robinson, of Taunton, Mass.; and by Henry Brevout, of Boston, Mass., and Thomas Osgood, of Troy, N. Y.

And further, that the principle of rolling substances between vibrating or reciprocating tables, surfaces, or plates, has been employed since the year 1819 by Doct. Henry James, of Waterford, in the State of New York, for the manufacture of pills; and also in a pill machine patented July 10th, 1807, by Webster Lewis, of the city of New York, and by other persons for the same and for various other purposes.

That the supposed invention and inventions, claimed in said letters

patent to said Henry Burden, had been, anterior to the supposed discovery thereof by the said Henry Burden, described in the following public works, namely: in Brewster's new Edenburgh Encyclopedia, American edition of 1819, vol. 11, article iron, page 477. In the Library of Useful Knowledge, No. 106, on the manufacture of iron, published in pamphlet form in London, in 1831, under the superintendence of the Society for the Diffusion of Useful Knowledge, at page 20. In Dr. Ure's Dictionary of Art, Manufactures, and Sciences, London edition of 1841, article iron, subject roughing rolls, page 705. In a Dictionary of Mechanical Science, Arts, Manufactures, and Miscellaneous Knowledge, by Alexander Jamieson, London, 1828, article iron, page —. In Rees' Encyclopedia, vol. 20, article iron, § 4; and in the Encyclopedia Britannica, or Dictionary of Arts, Science, &c., vol. 12, page 437, article . In Nicholson's Operative Mechanic, London edition, 1825, page 335; and in the Encyclopedia Americana, vol. 7, 1831, article iron, page 72. That the infringement, alleged in the declaration to have been committed by the defendants, of the said letters patent to Henry Burden, was committed, if at all, by the use by the defendants of machinery covered and claimed by letters patent of the United States, issued to the defendant, John F. Winslow, on the 18th of December, 1847, for 14 years from that day, for his invention of a new and useful improvement in rolling and compressing puddlers' balls; such machinery being covered by the claim of the specification to said letters patent of December 18th, 1847, which claims the method substantially as described in said specification last named, of compressing or shingling puddlers' balls, or lumps of iron, into blooms by the combination of a cam-formed compressor and two or more rollers substantially as described in said specification, and of machinery covered and claimed by letters patent of the United States, issued to the said John F. Winslow on the 5th day of July, 1848, for 14 years from that day, for the invention, by said Winslow and one John Snyder, of a new and useful improvement in machinery for rolling puddlers' balls, and for which said new and useful improvement of said Winslow, he, the said Winslow, has also duly obtained letters patent issued in and for the kingdom of Great Britain.

That the machinery, so used by said defendants, rolls the puddle balls between a cam-formed roller and two cylinders, which so rotate as to retain the ball of iron in the same position whilst it is being gradually reduced in size by the cam-form of the periphery of one of the rollers; and that the said machinery has none of the essence of the principle contained or defined in the claim of the said letters patent of the said Henry Burden.

That in the defendants' machinery the ball of iron is neither rolled between a cylinder and an eccentric concave, nor between vibrating tables or curved vibrating surfaces, but between a cam-formed roller and two revolving cylinders or rollers. That in all the modes claimed in said letters patent to Henry Burden, the ball of iron moves along with the periphery of the cylinder, or with the vibrating tables, or with

the vibrating curved surfaces; while in the defendants' machinery the ball turns on its axis simply, and remains in the same position otherwise and within the reach and observation of the workmen.

That the said letters patent to the said Henry Burden are invalid for multiplicity of claim, claiming as they do at least two machines as distinct inventions, namely: first, causing the balls to pass between a revolving cylinder and a curved segmented trough adapted to it, which curved segmented trough is stationary. Secondly, causing the balls to pass between vibrating or reciprocating tables, surfaces, or plates, or between reciprocating curved surfaces operating upon the same principle. That if the said Henry Burden had been the first to invent the general principle of making or reducing puddlers' balls by rolling them, he could, under the 6th section of the act of July 4th, 1836, have described various modes in which he had contemplated the application of the principle and made claim to them. But that the principle of reducing puddlers' balls by rolling, not having been new at the time of the granting of said letters patent to said Burden, the same were issued for more than one modification of such general principle, and for more than one invention, and are therefore invalid. And the said defendants will give in evidence the said act of July 4th, 1836, and will insist that judgment be rendered for them herein with costs.

May 18, 1849.

SIR: Be pleased to take notice that, on trial of this action, the defendants will, under section 15 of the act of Congress, passed July 4, 1836, entitled "An act to promote the progress of the useful arts, and to repeal all acts and parts of acts heretofore made for that purpose," give in evidence the following special matter, namely:

That the two several letters patent of the 10th of December, 1840, mentioned in the declaration herein, are one and the same letters patent; that Henry Burden was not the original or first inventor or discoverer of the supposed new and useful machine for rolling puddle balls, or other masses of iron, in the manufacture of iron, described in the letters patent in the said declaration mentioned and referred to, or of either of the supposed machines described in the said letters patent, and for which the same were granted, or of any part thereof; that the said Henry Burden was not the original or first inventor or discoverer of the invention of preparing the puddlers' balls as they are delivered from the puddling furnace, or other similar masses of iron, by causing them to pass between a revolving cylinder and a curved segmental trough adapted thereto, constructed and operating substantially in the manner of those described in the specification annexed to the said letters patent, and represented in figures 2 and 3 of the drawings accompanying said letters patent and specification; and that he was not the original or first inventor or discoverer of the invention of preparing the puddlers' balls, as they are delivered from the puddling furnace, or other similar masses of iron, by causing them to pass between vibrating or reciprocating tables, surfaces, or plates of iron, in the manner exem-

plified in figure 1 in the drawings accompanying said specification; and that he was not the original or first inventor or discoverer of the invention of preparing puddlers' balls, as they are delivered from the puddling furnace, or other similar masses of iron, by causing them to pass between vibrating or reciprocating curved surfaces, operating upon the principle, and producing a like result, by means analogous to those described in said specification. That the said supposed invention or inventions, for which the said letters patent were granted to the said Henry Burden, was not, and were not, nor was either of them, at the time of granting the said letters patent, a new invention or inventions; but that, on the contrary, the method of squeezing out the impurities from, and of reducing or making puddlers' balls by rolling, had, long prior to the date of the said Henry Burden's alleged invention and inventions, and prior to the application of the said Henry Burden for his said letters patent, been known, and used, and practised, by the use of machines which are and were called roughing rolls, or rubbling rolls; which method and which machines were constructed upon the same principle, and embraced the supposed improvements and inventions for which the said letters patent were granted to the said Henry Burden, and were and are used for substantially the same purposes; and the same had been used in the years 1830 and 1831, at the city of New York, by Edward Dunscomb, of that place, and at his rolling mill at that place; in the year 1838 at Troy, in the State of New York, by the defendants, at their rolling mill in the immediate vicinity of the plaintiff's residence, and his place of business; in the years 1835, 1836, and 1837, at Boston, in the State of Massachusetts, by the Boston Iron Company; and that the same were in common use, and well known in the iron works, both in the United States and in Great Britain, from the year 1820 to the year 1840. And these defendants intend to prove that a knowledge of such use of the same as aforesaid, and where the same was so used, was, long prior to the year 1840, possessed by Charles M. Keller, of the city of New York; by Ralph Crocker, of Boston and of Roxbury, Massachusetts; by John Snyder, of Troy, New York; by William V. Many and Addison Low, both of Albany, New York; by George Odiorne, of Medford and of Boston, Massachusetts; by Richard Borden, of Fall River, Massachusetts; by John Skinner, jr., and William Butt, both of Saugerties, N. York; by Philip Borden, of Fall River, Massachusetts; by Increase Robinson, of Wareham, Mass.; by Charles Robinson, of Taunton, Mass.; by Henry Brevout, of East Boston, Mass.; and by Thomas Osgood & David Perry, both of Troy, N. York.

And further, that the mode of preparing substances, by causing them to pass between vibrating or reciprocating tables, surfaces, or plates, substantially in the same manner, and upon the principle exemplified in figure 1 in the drawings accompanying the said specification of the said letters patent to said Henry Burden, and also the mode of preparing substances, by causing them to pass between vibrating or reciprocating curved surfaces, operating upon the principle, and producing a like result, by means analogous to those described in said specification,

have been employed since the year 1819 by Dr. Henry James, of Waterford, in the State of New York, for the manufacture of pills; and also, since the year 1830, by Leonard Platt and Alfred Platt, both of Waterbury, in the State of Connecticut, in milling or rolling machines for milling or forming the edges of buttons; and also in a pill machine, patented July 10th, 1807, by Webster Lewis, of the city of New York, and by other persons for the same, and for other various purposes.

And further, that the mode of preparing substances, by causing them to pass between a revolving cylinder, and a curved segmental trough adapted thereto, constructed and operating substantially in the manner of those described in the said specification, and represented in figures 2 and 3 of the drawings accompanying said letters patent and specification, had been, long prior to the year 1840, used in wool-carding machines in various parts of the United States; and these defendants intend to prove, that a knowledge of such use of the same in wool-carding machines, and where the same had been used, was, long prior to the year 1840, possessed by William C. Hibbard, of Boston, and Ebenezer A. Lester, of Boston, of South Boston, and of Cambridge, Massachusetts; by Ralph Crocker, of Roxbury and of Boston, Massachusetts; by William Boardman, of Nashua, New Hampshire; and by Simeon Borden and Richard Borden, both of Fall River, Mass.

And further, that the said last named mode had been, long prior to the year 1840, used in agricultural implements, called corn shellers, in various parts of the United States; and these defendants intend to prove, that a knowledge of such use of the same in corn shellers, and where the same had been used, was, long prior to the year 1840, possessed by William C. Hibbard, of Boston, Massachusetts; by Ralph Crocker, of Roxbury and of Boston, Massachusetts; and by William Boardman, of Nashua, New Hampshire.

And further, that the said last named mode had been, long prior to the year 1840, and as early as the year 1808, used in machines for making shot, by pressure, in various parts of the United States, and particularly in the city of Washington, in the District of Columbia, by Thomas Bruff, and that the same was, and is, fully described and set forth in letters patent of the United States, granted to Thomas Bruff, of Washington aforesaid, for a machine for manufacturing shot by pressure, October 5th, 1808; and in other letters patent of the United States, granted to the said Bruff for another machine for manufacturing shot by pressure, June 4th, 1813, which two letters patent are recorded in the Patent office at Washington; and these defendants intend to prove that a knowledge of such use of the same, in a machine for making shot by pressure, and where the same had been so used, and of the said patent of 1808, was, as early as the year 1811, possessed by Ebenezer A. Lester, of Boston, of South Boston, and of Cambridge, Massachusetts.

And further, that the said last named mode had been, long prior to the year 1840, used in coffee mills in various parts of the United States, and that the same was, and is, fully described and set forth in letters

patent of the United States, granted to Hiram Twiss, of Meriden, Connecticut, for a coffee mill, November 19th, 1837; which letters patent are recorded in the Patent office at Washington.

And further, that the said last named mode had been, long prior to the year 1840, used in machines for milling the edges of metallic coin in various parts of the United States, and particularly at Norton, in the State of Massachusetts; also at the mint of the United States, in the city of Philadelphia; and these defendants intend to prove, that a knowledge of such use of the same, in machines for milling the edges of metallic coin, and where the same has been so used, was, long prior to the year 1840, possessed by Isaac Babbitt, of Boston, Massachusetts; by Ebenezer Bradbury, of Norton and of Boston, Massachusetts; by George Crocker and William Crocker, both of Taunton, Massachusetts; and by Franklin Pearle, of the city of Philadelphia, and superintendent of the mint of the United States at that place.

And further, that the said last named mode had been, long prior to the year 1840, used in milling or rolling machines for milling or forming the edges of buttons, and in machines for finishing or minting the edges of buttons in various parts of the United States, and particularly at Waterbury, in the State of Connecticut; and these defendants intend to prove that a knowledge of such use of the same in milling or rolling machines for milling or forming the edges of buttons, and in machines for finishing or minting the edges of buttons, and where the same had been so used, was, long prior to the year 1840, possessed by Leander Platt and by Alfred Platt, both of Waterbury, in the State of Connecticut.

And further, that the supposed new and useful machine for rolling puddle balls and other masses of iron in the manufacture of iron, described in the said letters patent in the said declaration mentioned, and the inventions described and claimed as new in the said letters patent to said Henry Burden, namely, the invention of preparing the puddlers' balls as they are delivered from the puddling furnace, or other similar masses of iron, by causing them to pass between a revolving cylinder and a curved segmental trough adapted thereto, constructed and operating substantially in the manner of those described in the specification annexed to the said letters patent, and represented in figures 2 and 3 of the drawings accompanying said letters patent and specification, and the invention of preparing the puddlers' balls as they are delivered from the puddling furnace, or other similar masses of iron, by causing them to pass between vibrating or reciprocating tables, surfaces, or plates of iron, in the manner exemplified in figure 1 in the drawings accompanying said specification; and the invention of preparing puddlers' balls as they are delivered from the puddling furnace, or other similar masses of iron, by causing them to pass between vibrating or reciprocating curved surfaces, operating upon the principle and producing a like result by means analogous to those described in said specification, and each of said inventions had, long prior to the date of the said Henry Burden's said alleged inventions, and long prior to the ap-

plication of the said Henry Burden for his said letters patent, been known, and used, and practised, by the use as aforesaid of the said roughing rolls or rubbling rolls, and of the said machine for the manufacture of pills so employed by the said Dr. Henry James, and of the said pill machine so patented by said Webster Lewis, and of the said wool carding machines, and of the said corn shellers, and of the said machines for making shot by pressure so patented by said Thomas Bruff, and of the said coffee mill so patented by the said Hiram Twiss, and of the said machines for milling the edges of metallic coin, and of the said milling or rolling machines for milling or forming the edges of buttons, and of the said machines for finishing or minting the edges of buttons; and these defendants intend to prove that a knowledge of the same respectively, and of such use of the same respectively, as aforesaid, and where the same respectively had been used, was, long prior to the year 1840, possessed by the several persons herein before respectively specified; and these defendants will give in evidence, for the purpose of proving the several matters herein before set forth, the several letters patent herein before named, or duly certified copies of the same.

And further, that the supposed invention and inventions claimed in said letters patent to said Henry Burden, had been anterior to the supposed discovery thereof by the said Henry Burden described in the following public works, namely, in Brewster's New Edinburgh Encyclopedia, American edition of 1819, volume 11, article iron, page 477; in the library of useful knowledge, No. 106, on the manufacture of iron, published in pamphlet form in London in 1831, under the superintendence of the society for the diffusion of useful knowledge, at page 20; in Dr. Ures' dictionary of arts, manufactures, and mines, London edition of 1840, article iron, subject roughing rolls, page 705; in a dictionary of mechanical science, arts, manufactures, and miscellaneous knowledge, by Alexander Jamieson, London, 1828, article iron; in *Lee's* encyclopedia, vol. 20, article iron, section 4; in the Encyclopedia Britannica, or dictionary of arts, science, &c., vol. 12, page 427; in Nicholson's operative mechanic, London edition, 1825, page 335; and in the Encyclopedia Americana, volume 7, 1831, article iron, page 72.

That the infringement alleged in the declaration to have been committed by the defendants of said letters patent to Henry Burden, was committed, if at all, by the use, by the defendants, of machinery covered and claimed by letters patent of the United States, issued to the defendant, John F. Winslow, on the 18th day of December, 1847, for fourteen years from that day, for his invention of a new and useful improvement in rolling and compressing puddlers' balls; such machinery being covered by the claim of the specification to said letters patent, of December 18th, 1847, which claims the method, substantially as described in said specification last named, of compressing or shingling puddlers' balls or lumps of iron into blooms, by the combination of a cam-formed compressor, and two or more rollers, substantially as described in said specification; and of machinery covered and claimed

by letters patent of the United States, issued to the said John F. Winslow on the 5th day of July, 1848, for fourteen years from that day, for the invention, by said Winslow and one John Snyder, of a new and useful improvement in machinery for rolling puddlers' balls, and for which said new and useful improvement of said Winslow, he, the said Winslow, has also duly obtained letters patent, issued in and for the kingdom of Great Britain. That the machinery, so used by said defendants, rolls the puddle balls between a cam-formed roller and two cylinders, which so rotate as to retain the ball of iron in the same position while it is being gradually reduced in size by the cam-form of the periphery of one of the rollers, and that the said machinery has none of the essence of the principle contained or defined in any one of the claims of the said letters patent of the said Henry Burden. That, in the defendants' machinery, the ball of iron is neither rolled between a cylinder and an eccentric concave, nor between vibrating tables, or curved vibrating surfaces, but between a cam-formed roller and two revolving cylinders or rollers; that, in all the modes claimed in said letters patent to Henry Burden, the ball of iron moves along with the periphery of the cylinder, or with the vibrating tables, or with the vibrating curved surfaces; while, in the defendant's machinery, the ball turns on its axis simply, and remains in the same position otherwise, and within the reach and observation of the workman.

That the said letters patent to the said Henry Burden are invalid for multiplicity of claim, claiming, as they do, at least two machines as distinct inventions, namely: first, causing the balls to pass between a revolving cylinder and a curved segmental trough adapted to it, which curved segmental trough is stationary; secondly, causing the balls to pass between vibrating or reciprocating tables upon the same principle. That if the said Henry Burden had been the first to invent the general principle of working or reducing puddlers' balls by rolling them, he could, under the 6th section of the act of July 4th, 1836, have described various modes in which he had contemplated the application of the principle, and made claim to them; but that the principle of reducing puddlers' balls by rolling not having been new at the time of the granting of said letters patent to said Burden, the same were issued for more than one modification of such general principle, and for more than one invention, and are therefore invalid.

And the said defendants will give in evidence the said act of July 4th, 1836, and will insist that judgment be rendered for them therein, with costs.

September 15th, 1849.

And hereupon the process thereof is continued between the parties aforesaid, of the plea aforesaid in this same court, before the judges thereof, and the issue above joined is ordered by the said court to be tried, at a term thereof to be held at the court-house in the village of Canandaigua, in said district, on the 5th day of July, 1850; on which day and place last aforesaid came the said plaintiff, by Stevens, Ed-

wards & Meads, his attorneys, who have been duly substituted in the place of Samuel Stevens; and the said defendants come, by their said attorney, before the Hon. Alfred Conkling, one of the judges of the said court assigned to hold the said circuit court. And the jurors of the jury summoned to try the said issue being called also come, who, to speak the truth of the matter aforesaid being chosen, tried, and sworn, say, upon their oath, that the said defendants are guilty of the said grievances in manner and form as alleged in said declaration, and they assess the damages of the said plaintiff, by reason thereof, at the sum of one hundred dollars over and above the costs of the said plaintiff in this behalf laid out and expended, and for these costs and charges to six cents. And because the said court now here is not yet advised what judgment to give of and upon the premises, therefore the process thereof is continued between the parties aforesaid of the plea aforesaid, in this same court, until the third Tuesday of January, 1852, to wit, on the 30th of January, at an adjourned term at the City Hall in the city of Albany; and the same day is given to the parties aforesaid, at the same place, to hear the judgment of the said court thereupon. On which last mentioned day came the said parties, by their said attorneys, and thereupon all and singular the premises being seen, and by the said court fully understood, therefore it is considered that the verdict aforesaid, of the jurors aforesaid, in form aforesaid given, is, in all respects, good and valid in law.

And it is therefore considered that the said plaintiff do recover against the said defendant his said damages, costs, and charges, by the jurors aforesaid, in manner and form aforesaid assessed, and also nine hundred and fifty-two and $\frac{63}{100}$ dollars, for his said costs and charges by him about his suit in this behalf expended, by the court now here adjudged of increase to the said plaintiff, and with his assent; which said damages, costs, and charges, in the whole, amount to $1,052 69.

Judgment signed this 24th day of April, 1852.

A. A. BOYCE, *Clerk.*

(*Endorsed on the back thereof.*)

CIRCUIT COURT OF THE UNITED STATES,
For the northern district of New York.

PETER A. BURDEN
vs.
ERASTUS CORNING & JOHN F. WINSLOW.

Judgment record.

STEVENS, EDWARDS & MEADS,
Plaintiffs' attorneys, Albany.

$100	00	damages.
	06	costs.
952	63	tax costs.
$1,052	69	

May 21st, 1852. On retaxation, both parties appearing, costs taxed at $924 52.

A. A. BOYCE, *Clerk.*

Filed April 24th, 1850.

Supreme Court of the United Sates.

ERASTUS CORNING and John F. Winslow, plaintiffs in error,
vs.
PETER A. BURDEN, defendant in error.

Afterwards, to wit, on the first Monday of December, in the year of our Lord one thousand eight hundred and fifty-two, in the Supreme Court of the United States, before the justices thereof, at the city of Washington, come the said Erastus Corning and John F. Winslow, by David L. Seymour, their attorney, and say, that in the record and proceedings aforesaid, and also in giving the judgment aforesaid, there is manifest error in this, to wit, that the declaration aforesaid, and the matters therein contained, are not sufficient in law for the said Peter A. Burden to have or maintain his aforesaid action thereof against the said Erastus Corning and John F. Winslow; there is also error in this, to wit, that by the record aforesaid it appears that the judgment aforesaid, in form aforesaid given, was given for the said Peter A. Burden against the said Erastus Corning and John F. Winslow, whereas, by the law of the land, the said judgment ought to have been given for the said Erastus Corning and John F. Winslow against the said Peter A. Burden. And the said Erastus Corning prays, that the judgment aforesaid, for the errors aforesaid, and other errors in the record and proceedings aforesaid, may be reversed, annulled, and altogether held for nothing, and that they may be restored to all things which they have lost by occasion of the said judgment, &c.

D. L. SEYMOUR,
Attorneys for Plaintiffs in errors.
S. BLATCHFORD,
Of Counsel.